
State of California
The Resources Agency
Department of Water Resources

Aesthetic/Visual Resources Report

FINAL

L-4

**Oroville Facilities Relicensing
FERC Project No. 2100**



JULY 2004

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AESTHETIC/VISUAL RESOURCES REPORT

FINAL

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**Oroville Facilities Relicensing
FERC Project No. 2100**

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REPORT SUMMARY

The *Aesthetic/Visual Resources Report* presents the results of the Relicensing Study L-4: Aesthetic/Visual Study. The California Department of Water Resources (DWR) commissioned this study as part of the relicensing process for the preparation of a license application to be submitted to the Federal Energy Regulatory Commission (FERC) for the Oroville Facilities (FERC Project No. 2100). This study was conducted to satisfy FERC requirements in addition to those associated with the National Environmental Policy Act (NEPA), and the California Environmental Quality Act (CEQA). The study's five objectives were to:

- Describe the aesthetic/visual environment of the study area;
- Describe the aesthetic/visual characteristics of Project facilities;
- Evaluate the effects that Project facilities and operations have on the aesthetic/visual environment of the study area;
- Evaluate the consistency of the Project with policies, elements, standards, and guidelines of entities with the responsibility of managing lands near the Project; and
- Address aesthetic/visual issues raised during scoping.

The study involved working with the Land Use, Land Management, and Aesthetics Work Group (LULMAWG). One of the first tasks of the study was to identify potential Key Observation Points (KOPs) to represent views from around the Project. The LULMAWG identified 55 potential KOPS, of which 25 were selected after field review to represent existing aesthetic/visual conditions around the Project and to analyze the effects of the Project on the aesthetic/visual environment. These 25 KOPs represented different kinds of viewing areas, such as developed recreation facilities, primitive recreation facilities, and highways. The KOPs were intentionally located in the following four geographically and aesthetically/visually distinct areas:

- Lake Oroville;
- Thermalito Forebay and Diversion Pool;
- Thermalito Afterbay; and
- Low Flow Channel (LFC) – Oroville Wildlife Area (OWA).

After describing the representative KOPs, the report addresses the aesthetic/visual environment in which the Project is located. It does this by characterizing topographic features, types of views available within the Project (extensive open views, enclosed views, etc), vegetation patterns, land use, and types of viewers (recreationists, motorists, etc.).

To evaluate the effect of the Project on the aesthetic/visual environment, two approaches are used. The first approach describes the general effects that Project facilities and operations (e.g., reservoir elevations) have on the areas from which they can be seen. The effects of Project facilities and operations were rated as:

- Positive
- Moderately positive
- Neutral
- Moderately negative
- Negative

As would be expected at a major water storage project such as the Oroville Project, the effects of the Project on the aesthetic/visual environment are varied. Project facilities generally have varying degrees of negative effects on the aesthetic/visual environment based on the degree of contrast that the facilities have with their surroundings. The degree of contrast of the facilities is based on a number of factors such as distance from the facility to viewer, and the facilities scale, color, form, line, and texture.

The bodies of water created by the Project have positive effects on the aesthetic/visual environment when they are near full capacity. The influence of operations on the aesthetic/visual environment of Lake Oroville varies. As with most major storage reservoirs in the western United States, large annual reservoir elevation fluctuations have very different seasonal effects on the aesthetic/visual environment of the reservoirs. When Lake Oroville is at or near full pool, it has a positive effect on its aesthetic/visual environment. When it is at lower elevations, the degree of contrast of the exposed shoreline between the water level and the shoreline vegetation can be great, and the effect can vary from neutral to negative. The Diversion Pool, Thermalito Forebay, and Thermalito Afterbay generally have relatively little reservoir fluctuation, and thus have positive effects on their aesthetic/visual environment throughout most of the year.

The second approach was to evaluate the effect that Project facilities and operations have on the aesthetic/visual environment of the 25 representative KOPs. Many of the Project facilities cannot be seen throughout much of the study area; therefore, some are seen from relatively few KOPs. Project operations, on the other hand, affect the aesthetic/visual environment of all of the KOPs. The effects of Project facilities and operations on KOPs also ranged from positive to negative.

In addition to evaluating the effect of Project facilities and operations on the general aesthetic/visual environment and on KOPs, the report examines the consistency of Project facilities and operations with aesthetic/visual related policies, regulations, guidelines, and standards developed by land management entities with management responsibilities for lands near the Project. These include the U.S. Forest Service (USFS), the Bureau of Land Management (BLM), the California Department of Transportation (CalTrans), and Butte County. It was determined that the Project was consistent with the policies, regulations, guidelines, and standards of these entities.

In the last section of the report, aesthetic issues that were identified during scoping are examined. The report identifies how these issues were addressed and their current

status (i.e., Protection, Enhancement, and Mitigation [PM&E] measures proposed by the LULMAWG). These issues include:

- The effects of drawdowns on visual quality;
- The effects of Project construction debris, garbage, and invasive species on the appearance of Project lands; and
- Appropriate measures for the aesthetic enhancement of Project lands.

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ACRONYMS

BLM	Bureau of Land Management
BR	Boat Ramp
CalTrans	California Department of Transportation
CEQA	California Environmental Quality Act
cfs	cubic feet per second
DFG	Department of Fish and Game
DPR	Department of Parks and Recreation
DUA	day use area
DWR	Department of Water Resources
FERC	Federal Energy Regulatory Commission
ft	feet
IIP	Initial Information Package
ISO	Independent System Operator
KOP	Key Observation Point
kV	kilovolt
LFC	Low Flow Channel
LOSRA	Lake Oroville State Recreation Area
LRMP	Land and Resource Management Plan
LULMAWG	Land Use, Land Management, Aesthetics Work Group
maf	million acre-feet
MR	Main Reservoir
MW	megawatt
NA	Not Applicable
NEPA	National Environmental Policy Act
NGO	non-governmental organization
NOAA Fisheries	National Oceanic and Atmospheric Administration National Marine Fisheries Service
OWA	Oroville Wildlife Area
PDEA	Preliminary Draft Environmental Assessment
PM&E	Protection, Mitigation and Enhancement
R&PP	Recreation and Public Purpose Act
RMP	Resource Management Plan
ROW	right of way
S-H	Scenic Highway
SVRA	State Vehicle Recreation Area
SWP	State Water Project
TA	Thermalito Afterbay
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
VMS	Visual Management System
VQO	visual quality objective
VRM	Visual Resource Management

1.0 INTRODUCTION

The California Department of Water Resources (DWR) has prepared this report to present the results of Relicensing Study L-4 - *Aesthetic/Visual Study*. This study was conducted as part of the relicensing process for the Oroville Facilities hydroelectric project (Federal Energy Regulatory Commission [FERC] Project No. 2100). This report presents an evaluation of the effects of Project facilities and operations on the surrounding aesthetic/visual environment, as required by FERC, as well as the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) (see Section 1.1.1 below). Aesthetic/visual studies also typically address issues that are raised during the scoping process. Ultimately, the results of this study will be used as the basis for the aesthetic/visual analysis conducted as part of a Preliminary Draft Environmental Assessment (PDEA) to evaluate the effects of various alternatives on the Project's aesthetic/visual environment.

The first task of this study was to inventory and characterize the existing aesthetic/visual environment of the study area. For the purpose of this report, the aesthetic/visual environment is considered in terms of visual components, only. Noise and odor issues are sometimes examined in aesthetic studies, but were not in this study because no issues were raised during scoping or by the Land Use, Land Management and Aesthetics Work Group (LULMAWG). The study assessed the level of contrast or compatibility of Project facilities and operations with the aesthetic/visual environment of areas from which they can be viewed. The study also examined consistency issues related to aesthetic/visual policies, elements, standards, and guidelines of entities with the responsibility of managing lands near the Project. In addition, the study responded to issues related to aesthetic/visual resources that were raised during the scoping process or during the LULMAWG meetings.

The first chapter in this report is an introductory chapter that includes background information (Section 1.1), a description of facilities (Section 1.2), and a discussion of current operating constraints (Section 1.3). Chapter 2 describes the need for the study, while Chapter 3 discusses the study objectives. Chapter 4 contains a discussion of the methodology used to conduct the study. It begins with a discussion of the methodology used for the existing conditions inventory (Section 4.1) and concludes with a description of the methodology used to evaluate the effect of Project facilities and operations on the aesthetic/visual environment. Chapter 5 (Existing Aesthetic/Visual Environment) discusses the aesthetic/visual character of the study area and the Project. Section 5.1 briefly describes the aesthetic/visual characteristics of the Project region, while Section 5.2 describes the aesthetic/visual characteristics of the study area in more detail. Section 5.3 reviews regulations, guidelines, and standards that are related to aesthetic/visual resources. Section 6 evaluates the effects of existing Project facilities and operations on the aesthetic/visual environment of the study area. Sections 6.1 through 6.4 evaluate the effects of Project facilities and operations on four subareas of the Project: Lake Oroville, the Thermalito Diversion Pool and Forebay, the Thermalito Afterbay, and the Low Flow Channel (LFC)/Oroville Wildlife Area (OWA). Section 6.5

discusses Project consistency with aesthetic/visual policies, elements, regulations, guidelines and standards. Appendix A includes detailed descriptions (and photographs) of the representative KOPs, while Appendix B contains detailed forms for the evaluation of the effects of Project facilities and operations on the aesthetic/visual environment of the study area.

1.1 BACKGROUND INFORMATION

1.1.1 Statutory/Regulatory Requirements

DWR owns and operates the Oroville Facilities, a multipurpose water supply, flood control, power generation, recreation, fish and wildlife enhancement, and salinity control project on the Feather River in Butte County. The power generation facilities currently operate under a license issued by FERC, which expires on January 31, 2007. DWR intends to submit an application for a new FERC license at least 2 years prior to the expiration of the current license. The proposed relicensing process is based on cooperation and collaboration with Federal and State resource agencies, Indian Tribes, local governments, non-governmental organizations (NGOs), and interested members of the public. Specific tasks of Relicensing Study L-4 – *Aesthetic/Visual Resources Report*, are required by FERC under 18 CFR 4.51 (6)(iii) as part of the relicensing process.

The purpose of the L-4 study was to inventory and characterize the aesthetic/visual environment of the Project area and to determine the influence of Project facilities and operations on that environment. For the purposes of the study, aesthetic/visual resources were considered primarily in terms of visual resources because no issues related to noise or odor were raised during the scoping process or during LULMAWG meetings. As required by FERC, the study assessed the level of contrast or compatibility of project facilities and operations with the Project's aesthetic/visual environment and will provide baseline information that will be used by DWR for decision-making regarding relicensing issues associated with aesthetic/visual resources and potential PME measures.

1.1.2 Study Area

The Oroville Facilities are located on the Feather River in the Sierra Nevada foothills in Butte County, California, approximately 75 miles north of Sacramento. The Project boundary, which includes all of the Oroville Facilities, encompasses approximately 41,140 acres, and includes the following:

- Lake Oroville;
- Thermalito Afterbay;
- North Thermalito Forebay;
- South Thermalito Forebay;
- OWA;

- Feather River, between Lake Oroville Dam and Lake Oroville Boulevard; and
- Feather River Fish Hatchery.

For the purposes of this report, the study area includes all lands within and adjacent to (within ¼ mile) of the Project boundary; under this definition, the study area encompasses roughly 70,530 acres. Areas from which the Project can be seen beyond the ¼ mile of the study area were also considered for this study.

1.2 DESCRIPTION OF FACILITIES

The Oroville Facilities were developed as part of the State Water Project (SWP), a water storage and delivery system of reservoirs, aqueducts, power plants, and pumping plants. The main purpose of the SWP is to store and distribute water to supplement the needs of urban and agricultural water users in Northern California, the San Francisco Bay area, the San Joaquin Valley, and Southern California. The Oroville Facilities are also operated for flood control and power generation, to improve water quality in the Delta, enhance fish and wildlife, and provide recreation.

FERC Project No. 2100 encompasses 41,100 acres and includes Oroville Dam and Reservoir, three power plants (Hyatt Pumping-Generating Plant, Thermalito Diversion Dam Power Plant, and Thermalito Pumping-Generating Plant), Thermalito Diversion Dam, the Feather River Fish Hatchery and Fish Barrier Dam, Thermalito Power Canal, OWA, Thermalito Forebay and Forebay Dam, Thermalito Afterbay and Afterbay Dam, transmission lines, and a relatively large number of recreational facilities. An overview of these facilities is provided in Figure 1.2-1. Oroville Dam, along with two small saddle dams, impounds Lake Oroville, a 3.5-million-acre-foot (maf) capacity storage reservoir with a surface area of 15,810 acres at its maximum normal operating level of 900 feet (ft) above mean sea level (msl).

The hydroelectric facilities have a combined licensed generating capacity of approximately 762 MW. The Hyatt Pumping-Generating Plant is the largest of the three power plants with a capacity of 645 MW. Water from the six-unit underground power plant (three conventional generating and three pumping-generating units) is discharged through two tunnels into the Feather River just downstream of Oroville Dam. The plant has a generating and pumping flow capacity of 16,950 cubic ft per second (cfs) and 5,610 cfs, respectively. Other generation facilities include the 3-MW Thermalito Diversion Dam Power Plant and the 114-MW Thermalito Pumping-Generating Plant.

Thermalito Diversion Dam, 4 miles downstream of the Oroville Dam, creates a tail water pool for the Hyatt Pumping-Generating Plant and is used to divert water into the Thermalito Power Canal. Thermalito Diversion Dam Power Plant is a 3-MW power plant located on the left abutment of the diversion dam. The power plant releases a maximum of 615 cfs of water into the river.

The Thermalito Power Canal is a 10,000-ft-long channel designed to convey generating flows of 16,900 cfs to the Thermalito Forebay and pump-back flows to the Hyatt Pumping-Generating Plant. Thermalito Forebay is an off-stream regulating reservoir for the Thermalito Pumping-Generating Plant. The Thermalito Pumping-Generating Plant is designed to operate in tandem with the Hyatt Pumping-Generating Plant and has generating and pump-back flow capacities of 17,400 cfs and 9,120 cfs, respectively. When in generating mode, the Thermalito Pumping-Generating Plant discharges into Thermalito Afterbay, which is contained by a 42,000-ft-long earthfill dam. The Afterbay is used to release water into the Feather River downstream of the Oroville Facilities, and helps regulate the power system, provides storage for pump-back operations, provides recreational opportunities, and provides local irrigation water. Several local irrigation districts receive Lake Oroville water via the Afterbay.

The Fish Barrier Dam is downstream of the Thermalito Diversion Dam and immediately upstream of the Feather River Fish Hatchery. The flow over the dam maintains fish habitat in the LFC of the Feather River between the dam and the Thermalito Afterbay outlet, and provides attraction flow for the hatchery. The hatchery is an anadromous fish hatchery intended to compensate for salmon and steelhead spawning grounds made unreachable by construction of Oroville Dam. Hatchery facilities have a production capacity of 10 million fall-run salmon, 5 million spring-run salmon, and 450,000 steelhead annually (pers. comm., Kastner 2003). However, diseases have occasionally reduced hatchery production in recent years.

The Oroville Facilities support a wide variety of recreational opportunities. These opportunities include boating (several types), fishing (several types), fully developed and primitive camping (including boat-in and floating sites), picnicking, swimming, horseback riding, hiking, off-road bicycle riding, wildlife watching, and hunting. There are also visitor information sites with cultural and informational displays about the developed facilities and the natural environment. There are major recreation facilities at Loafer Creek, Bidwell Canyon, Spillway, Lime Saddle, and Thermalito Forebay. Lake Oroville has two full-service marinas, five car-top boat ramps, 10 floating campsites, and seven two-stall floating toilets. There are also recreation facilities at the Lake Oroville Visitors Center, Thermalito Afterbay, and OWA.

The OWA comprises approximately 11,000 acres west of Oroville that is managed for wildlife habitat and recreational activities. It includes Thermalito Afterbay and surrounding lands (approximately 6,000 acres) along with 5,000 acres adjoining the Feather River. The 5,000-acre area is adjacent to or straddles 12 miles of the Feather River, and includes willow- and cottonwood-lined ponds, islands, and channels. Recreation areas include dispersed recreation (hunting, fishing, and bird watching), plus recreation at developed sites, including Monument Hill Day Use Area (DUA), model airplane grounds, and three boat ramps on the afterbay and two on the river, and two primitive camping areas. The California Department of Fish and Game's (DFG) habitat enhancement program includes a wood duck nest-box program and dry-land farming for

Insert Figure 1.2-1.

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nesting cover and improved wildlife forage. Limited gravel extraction also occurs in a few locations.

1.3 CURRENT OPERATIONAL CONSTRAINTS

Operation of the Oroville Facilities varies seasonally, weekly, and hourly, depending on hydrology and the objectives that the DWR is trying to meet. Typically, releases to the Feather River are managed to conserve water while meeting a variety of water delivery requirements, including flow, temperature, fisheries, diversion, and water quality. Lake Oroville stores winter and spring runoff for release to the Feather River as necessary for project purposes. Meeting the water supply objectives of the SWP has always been the primary consideration for determining Oroville Facilities operation (within the regulatory constraints specified for flood control, instream fisheries, and downstream uses). Power production is scheduled within the boundaries specified by the water operations criteria noted above. Annual operations planning is conducted for multiyear carryover storage. The current methodology is to retain half of the Lake Oroville storage above a specific level for subsequent years. Currently, that level has been established at 1.0 maf; however, this does not limit drawdown of the reservoir below that level. If hydrology is drier or requirements greater than expected, additional water could be released from Lake Oroville. The operations plan is updated regularly to reflect forecast changes in hydrology and downstream operations. Typically, Lake Oroville is filled to its maximum operating level of 900 ft above msl in June and then lowered as necessary to meet downstream requirements, to a minimum level in December or January (approximately 700 msl). During drier years, the reservoir may be drawn down more and may not fill to desired levels the following spring. Project operations are directly constrained by downstream operational demands and flood management criteria as described below.

1.3.1 Downstream Operation

An August 1983 agreement between DWR and DFG entitled *Agreement Concerning the Operation of the Oroville Division of the State Water Project for Management of Fish & Wildlife* (DWR and DFG 1983) sets criteria and objectives for flow and temperatures in the LFC and the reach of the Feather River between Thermalito Afterbay and Verona. This agreement: (1) establishes minimum flows between the Thermalito Afterbay outlet and Verona that vary by water year type; (2) requires flow changes under 2,500 cfs to be reduced by no more than 200 cfs during any 24-hour period (except for flood management, failures, etc.); (3) requires flow stability during the peak of the fall-run Chinook salmon spawning season; and (4) sets an objective of suitable temperature conditions during the fall months for salmon and during the spring/summer for shad and striped bass.

1.3.1.1 Instream Flow Requirements

The Oroville Facilities are operated to meet minimum flows in the lower Feather River as established by the 1983 agreement (see above). The agreement specifies that Oroville Facilities release a minimum of 600 cfs into the Feather River from the

Thermalito Diversion Dam for fisheries purposes. This is the total volume of flows from the diversion dam outlet, the diversion dam power plant, and the Feather River Fish Hatchery pipeline.

Generally, the instream flow requirements below Thermalito Afterbay are 1,700 cfs from October through March, and 1,000 cfs from April through September. However, if runoff for the previous April–July period is less than 1,942,000 acre-ft (af) (i.e., the 1911–1960 mean unimpaired runoff near Oroville), the minimum flow can be reduced to 1,200 cfs from October to February, and 1,000 cfs for March. A maximum flow of 2,500 cfs is not exceeded from October 15 through November 30 to prevent spawning in overbank areas that might become de-watered.

1.3.1.2 Temperature Requirements

The Diversion Pool provides the water supply for the Feather River Fish Hatchery. The hatchery temperature objectives are 52°F for September, 51°F for October and November, 55°F for December through March, 51°F for April through May 15, 55°F for last half of May, 56°F for June 1–15, 60°F for June 16–August 15, and 58°F for August 16–31. In April through November, a temperature range of plus or minus 4°F is allowed for objectives.

There are several temperature objectives for the Feather River downstream of the Thermalito Afterbay outlet. During the fall months, after September 15, the temperatures must be suitable for fall-run Chinook salmon. From May through August, the temperatures must be suitable for shad, striped bass, and other fish.

National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) has also established an explicit criterion for steelhead trout and spring-run Chinook salmon, memorialized in a biological opinion on the effects of the Central Valley Project and SWP on Central Valley spring-run Chinook and steelhead. As a reasonable and prudent measure, DWR attempts to control water temperature at Feather River mile 61.6 (Robinson's Riffle in the low-flow channel) from June 1 through September 30. This measure attempts to maintain water temperatures less than or equal to 65°F on a daily average. The requirement is not intended to preclude pump-back operations at the Oroville Facilities needed to assist the State of California with supplying energy during periods when the California Independent System Operator (ISO) anticipates a Stage 2 or higher alert.

The hatchery and river water temperature objectives sometimes conflict with temperatures desired by agricultural diverters. Under existing agreements, DWR provides water for the Feather River Service Area contractors. The contractors claim a need for warmer water during spring and summer for rice germination and growth (i.e., minimum 65°F from approximately April through mid-May, and minimum 59°F during the remainder of the growing season), though there is no explicit obligation for DWR to

meet the rice water temperature goals. However, to the extent practical, DWR does use its operational flexibility to accommodate the Feather River Service Area contractors' temperature goals.

1.3.1.3 Water Diversions

Monthly irrigation diversions of up to 190,000 af (July 2002) are made from the Thermalito Complex during the May–August irrigation season. The total annual entitlement of the Butte and Sutter County agricultural users is approximately 1.0 maf. After these local demands are met, flows into the lower Feather River (and outside of the Project 2100 boundary) continue into the Sacramento River and into the Sacramento-San Joaquin Delta. In the northwestern portion of the Delta, water is pumped into the North Bay Aqueduct. In the south Delta, water is diverted into Clifton Court Forebay where the water is stored until it is pumped into the California Aqueduct.

1.3.1.4 Water Quality

Flows through the Delta are maintained to meet Bay-Delta water quality standards arising from DWR's water rights permits. These standards are designed to meet several water quality objectives such as salinity, Delta outflow, river flows, and export limits. The purpose of these objectives is to attain the highest reasonable water quality, considering all demands being made on the Bay-Delta waters. In particular, they protect a wide range of fish and wildlife including Chinook salmon, Delta smelt, striped bass, and the habitat of estuarine-dependent species.

1.3.2 Flood Management

The Oroville Facilities are an integral component of the flood management system for the Sacramento Valley. During the wintertime, the Oroville Facilities are operated under flood control requirements specified by the U.S. Army Corps of Engineers (USACE). Under these requirements, Lake Oroville is operated to maintain up to 750,000 af of storage space to allow for the capture of significant inflows. Flood control releases are based on the release schedule in the flood control diagram or the emergency spillway release diagram prepared by the USACE, whichever requires the greater release. Decisions regarding such releases are made in consultation with the USACE.

The flood control requirements are an example of multiple use of reservoir space. When flood management space is not required to accomplish flood management objectives, the reservoir space can be used for storing water. From October through March, the maximum allowable storage limit (point at which specific flood release would have to be made) varies from about 2.8 maf to 3.2 maf to ensure adequate space in Lake Oroville to handle flood flows. The actual encroachment demarcation is based on a wetness index, computed from accumulated basin precipitation. This allows higher levels in the reservoir when the prevailing hydrology is dry. When the wetness index is high in the basin (i.e., high potential runoff from the watershed above Lake Oroville),

required flood management space is at its greatest to provide the necessary flood protection. From April through June, the maximum allowable storage limit is increased as the flooding potential decreases, which allows capture of the higher spring flows for use later in the year. During September, the maximum allowable storage decreases again to prepare for the next flood season. During flood events, actual storage may encroach into the flood reservation zone to prevent or minimize downstream flooding along the Feather River.

2.0 NEED FOR STUDY

Relicensing Study L-4 describes the existing aesthetic/visual environment of the study area and assesses the relationship between the Project's existing facilities and operations and the aesthetic/visual environment of the study area. It does this to help meet the regulatory requirements of the FERC previously discussed in Section 1.1.1. The report discusses the issues related to aesthetic/visual environment that were identified during the scoping and LULMAWG process. In addition, the report examines the consistency of the Project with aesthetic/visual policies, elements, and guidelines of entities with the responsibility of managing lands near the Project.

This report has established the baseline conditions of the aesthetic/visual environment of the Project, including an assessment of how current Project facilities and operations affect the aesthetic/visual environment. This information will be used during the preparation of the PDEA to assess the effects of alternatives on the aesthetic/visual environment of the study area.

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3.0 STUDY OBJECTIVE(S)

This study was conducted to meet regulatory requirements and to address the aesthetic/visual issues that were raised during the scoping process and/or were identified by the LULMAWG (as noted in Chapter 2). The study had five objectives:

- Briefly describe the aesthetic/visual environment of the study area;
- Document the aesthetic/visual characteristics of Project facilities;
- Evaluate the effects that Project facilities and operations have on the study area's aesthetic/visual environment;
- Evaluate the consistency of the Project with relevant policies, elements, standards and guidelines of entities with the responsibility of managing lands in the study area; and
- Address the issues raised during scoping.

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4.0 METHODOLOGY

Prior to starting this study, the research team met with other work groups to determine where and when relevant data could be gathered and shared. The other work groups that were contacted included Engineering and Operations, Environmental, Cultural Resources, and Recreation and Socioeconomics. Much of the data collection that was done for this study occurred concurrently.

4.1 METHODOLOGY FOR EXISTING CONDITIONS INVENTORY

Prior to beginning field reconnaissance work, existing data related to aesthetic/visual resources was reviewed. Comprehensive management plans such as the Plumas National Forest's Land and Resource Management Plan (LRMP), the Bureau of Land Management's (BLM) Redding Resource Management Plan (RMP) and Butte County's General Plan were reviewed to gain information on policies, elements, standards, and guidelines related to aesthetic/visual resources.

To represent views of the Project that would be used to describe the existing conditions of the aesthetic/visual environment, potential KOPs were identified and presented to the LULMAWG for review and comment. The LULMAWG helped develop a list of 55 potential KOPs, with the understanding that a smaller number of these KOPs would be used to describe representative aesthetic/visual conditions at the Project. These potential KOPs would be used to assess the effects the Project has on the aesthetic/visual environment of the study area. These 55 potential KOPs represented popular and/or sensitive areas from around the study area from which the Project could be viewed, such as boat ramps, campgrounds, and roadways. After the list of potential KOPs was developed, field reconnaissance was conducted. Field work consisted of staff taking panoramic photographs at each potential KOP, video taping each potential KOP, and filling out a survey form that described existing conditions of each potential KOP. The visibility of Project and non-Project features (including shoreline conditions) that influence the aesthetic/visual environment of the study area was catalogued.

After the field work was completed, staff reviewed the merits of each of the 55 potential KOPs with the LULMAWG to determine the final group of KOPs. Twenty-five final KOPs were selected to depict the existing conditions around the Project and to analyze the effects it has on the aesthetic/visual environment (Figure 4.1-1). The 25 final KOPs were selected to represent views throughout the geographic range of the study area and to represent different types of locations (e.g., boat ramps, roadways, campgrounds, etc) which depict a variety of views. Table 4.1-1 describes the 25 KOPs and why each was selected, and Appendix A contains descriptions and photographs of each KOP.

Table 4.1-1. Rationale for KOP selection.

KOP	Why Selected	Marina	Boat Launch	Car Top Launch	Land Based Recreation Facility Accessible Only by Boat	Highway View	Trail
Main Reservoir (MR) – West Branch, North Fork							
MR-1: Nelson Bar Car-top Boat Ramp (BR)	To represent views of the West Branch and nearby lands from a car-top boat ramp facility located near the end of one of the Project's branches.			X			
MR-2: Lime Saddle BR	To represent views of the West Branch and nearby lands from one of the more used boat ramp facilities at the Project.		X				
MR-3: Lime Saddle Peninsula	To represent views of the West Branch and nearby lands from a peninsula overlooking the Lime Saddle Marina.	X					
MR – Middle and South Forks							
MR-4: Foreman Creek Car-top BR	To represent views from a car-top boat ramp facility of the main basin of the reservoir, nearby lands, and the Oroville Dam.			X			
MR-5: Canyon Creek Bridge	To represent views of a small, but very visible branch located off of the main basin of the reservoir.					X	
MR-6: Bidwell Bar Bridge (Highway 162)	To represent views of the main basin of the reservoir and nearby lands from Highway 162.					X	
MR-7: Stringtown Car-top BR	To represent views of the South Branch and nearby lands from a car-top boat ramp facility located near the end of one of the Project's branches.			X			
MR – South Part of Main Basin							
MR-8: Bidwell Canyon BR	To represent views of the main basin of the reservoir and nearby lands from one of the more used boat ramp facilities at the Project.		X				
MR-9: Bidwell Canyon Marina	To represent views of the largest marina in the Project from the adjacent paved hillside parking area.	X					
KOP MR-10:	To represent views of the cove to the south of the Bidwell Marina				X		

Table 4.1-1. Rationale for KOP selection.

KOP	Why Selected	Marina	Boat Launch	Car Top Launch	Land Based Recreation Facility Accessible Only by Boat	Highway View	Trail
Bidwell Canyon Cove to South	that is located between the marina and the Loafer Creek boat ramp.						
MR-11: Loafer Creek BR	To represent views of the main basin of the reservoir and nearby lands from a very popular boat ramp facility.		X				
MR-12: Lake Oroville Visitors Center Tower	To represent views of the Project from a popular tourist facility and the top of Kelly Ridge.				X		
MR-13: Oroville Dam Visitors Area –East Side	To represent views of the Oroville Dam as well as the main basin of the reservoir from an established overview area and Oroville Road.					X	
MR-14: Spillway BR	To represent views of the western part of the main basin of the reservoir and nearby lands from a heavily used boat ramp facility.		X				
<i>Thermalito Forebay and Diversion Pool (TD)</i>							
TD-1: Oroville Dam Road	To represent a view of the spillway. This view is especially spectacular during periods of high release from the reservoir.						
TD-2: Diversion Pool DUA	To represent a view of the Thermalito Diversion Pool and Thermalito Diversion Dam from the road/trail.				X		X
<i>Thermalito Forebay</i>							
TD-3: North Thermalito Forebay Recreation Area	To represent views of the Project from a highly developed and heavily used recreation facility.				X	X	
TD-4: South Thermalito Forebay Recreation Area	To represent views of the Project from a small recreation area with a boat ramp that receives substantial use.			X	X		

Table 4.1-1. Rationale for KOP selection.

KOP	Why Selected	Marina	Boat Launch	Car Top Launch	Land Based Recreation Facility Accessible Only by Boat	Highway View	Trail
<i>Thermalito Afterbay (TA)</i>							
TA-1: Larkin Road Car-top BR	To represent views of the Project from a primitive car-top boat ramp.			X			
TA-2: Monument Hill DUA	To represent views from Highway 99 of the Project from a large scale recreation facility and car top boat ramp.			X	X		
TA-3: Highway 99 Fish Hatchery	To represent views of the levee on the western edge of the Thermalito Afterbay.					X	
<i>Bypass Reach (BR)</i>							
BR-1: Feather River Nature Center	To represent views of numerous Project features including the Feather River Fish Hatchery, Fish Barrier Dam, and Thermalito Diversion Dam.				X		
BR-2: Thermalito Afterbay outlet	To represent views of the Thermalito Afterbay outlet into the Feather River from a small recreation area.				X		
<i>Oroville Wildlife Area (OWA)</i>							
OWA-1: One-Mile Campground (north)	To represent views of one of the few permanent recreation areas within the OWA.			X	X		
OWA-2: Bird Viewing Area	To represent views of a relatively high-use area in the OWA.				X		
TOTAL = 25		2	4	7	11	1	2

BR = boat ramp; DUA = day use area

Source: EDAW 2003

Insert Figure 4.1-1

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4.2 METHODOLOGY FOR ANALYSIS OF THE EFFECT OF THE PROJECT ON THE AESTHETIC/VISUAL ENVIRONMENT

The following discusses the methodologies used to evaluate the effects Project facilities and operations have on the study area's aesthetic/visual environment. It discusses how the general effects of Project facilities were determined, along with the general effects of Project operations, including three specific Lake Oroville elevations. The section concludes with a description of how the evaluation of the effects of Project facilities and operations on KOPs was conducted.

4.2.1 Evaluation Criteria

An evaluation of how the Project affects the aesthetic/visual environment of the Project was conducted for four geographic areas of the Project: Lake Oroville, the Thermalito Forebay and Diversion Pool, the Thermalito Afterbay, and the LFC/OWA area. The evaluation of each geographic area examined the general effects of Project facilities and operations on the aesthetic/visual environment and a more detailed evaluation of representative KOPs. The following describes the evaluation criteria used to evaluate the effect of Project facilities and operations on the Project's aesthetic/visual environment.

4.2.1.1 Project Facilities

The presence of Project facilities can have a direct effect on the aesthetic/visual environment of the study area. The effect that a facility has on nearby aesthetic/visual environments depends, to a large extent, upon the degree to which the facility contrasts or "fits in" with the surroundings. The degree with which a facility can be evaluated to contrast or fit in with its surroundings can be evaluated by examining five visual elements:

- **Scale** – The proportionate size of an object relative to the surroundings in which it is located;
- **Color** – Objects with colors that are similar to those of the landscape near them tend to blend with their surroundings, while objects that have contrasting colors will be highly visible. An example of a color contrast would be placing a bright red tower in front of a dark green hillside located immediately behind the tower. The color contrast would catch viewers' attention.
- **Form** – The mass or shape of an object or group of objects and how they relate to each other and the surroundings in which they are located. Some forms are similar or unified, such as a tall triangular object set among a group of similarly shaped trees. Other forms contrast, such as a tall, square building set in a landscape of low shrubs;
- **Line** – This term is used to describe the path, real or imagined, that the eye follows when perceiving continuity in form, color, or texture. Within landscapes,

lines may be ridges, skylines, structures, or vegetative types. For example, when viewing a continuous lakeshore edge the eye perceives the shoreline as an uninterrupted line unless an object (like a pier) disrupts it. The object would contrast with the visual line the eye was following; and

- **Texture** – This visual element is defined as the manifestations the interplay of light and shadow create through variations on the surface of an object or landscape. Objects that have similar textures tend to blend together, while objects with differing textures tend to contrast. A smooth concrete retaining wall next to a rough rocky slope would contrast in texture.

Using these five visual elements, the degree to which the Project facility contrasted with the surrounding area was described, based upon professional judgment. Project effects could be rated as positive, moderately positive, neutral, moderately negative, or negative. Unlike operations, it was assumed that the presence of Project facilities generally would not have a positive effect on the aesthetic/visual environment.

4.2.1.2 Project Operations

During annual operational cycles, varying amounts of shoreline are exposed when pool elevations of storage reservoirs such as Lake Oroville are drawn down. Reservoir drawdowns expose aesthetic/visual elements such as non-vegetated shoreline, areas of mud, natural debris (e.g., tree stumps and branches), and human-made debris (e.g., cans and car bodies). Most viewers would consider these elements to have negative influences on the aesthetic/visual environment. Positive effects of drawdowns can include exposing geologic features such as rock formations and stream channels. The amount of shoreline exposed depends upon the topography (steeper areas have less horizontal shoreline exposed than shallower areas). Drawdowns in shallower areas result in the water of the reservoir being a greater distance from the vegetated shoreline than in steeper areas. To evaluate the effects of drawdowns on the aesthetic/visual environment, three elevations were used to represent the reservoir at “high”(900 ft), “medium” (830 ft), and “low” (710 ft) elevations (see Section 6.1.2 for a discussion of how often these elevations are met or exceeded occur at Lake Oroville).

4.2.1.3 KOP Evaluations

Twenty-five KOPs were selected to represent views throughout the study area. The KOPs were used to evaluate the effect of Project facilities and operations on the aesthetic/visual environment. The KOP evaluation addresses several key questions or concerns: the effect the Project has on the existing aesthetic/visual environment, identifying ways in which the visual/aesthetic environment of the Project can be enhanced, and identifying areas of the Project that may benefit from enhancement. For example, enhancing an area that receives little use and/or where viewer sensitivity is low might not be warranted, while enhancing an area that receives high visitation and where viewer sensitivity is high might be warranted. The questions or concerns used to

evaluate each KOP, along with how each KOP was evaluated (summarized in Appendix B), are listed below.

Aesthetic/Visual Character

What is the current aesthetic/visual character represented by the view from each KOP?

The view represented in each KOP photograph was described and analyzed using the following key factors:

- Landform – The amount of vertical relief in the view (range from flat valley to steep sloping hillsides);
- Vegetation – The general type and amount of vegetation that is visible;
- Water – The prominence of water in the view from the KOP; and
- Man-made features – What built features are visible from the KOP that influence the aesthetic/visual environment and how do they contrast or blend in with the natural environment.

Numbers of Viewers

What is the relative number of viewers at each KOP?

The approximate number of people that experience the view from each particular KOP was noted. Because most of the KOP locations are recreation facilities, current general visitation ranges were able to be obtained from Relicensing Study R-1 – *Vehicular Access Study*. A 5-point scale was used to rate the relative numbers of visitors, with 1 representing a low estimated number (less than 10,000 visitors per year), 3 representing an average number (between 10,000 and 50,000 per year), and 5 representing a high number (above 50,000 per year).

Sensitivity of Viewers

What is the relative sensitivity of the viewers at each KOP?

In general, the longer a viewer observes the Project from a KOP, the more they notice and more sensitive they are to the aesthetic/visual environment. Different types of users have different types of sensitivity. For example, a picnicker would spend more time viewing an area and likely have more sensitivity to the aesthetic/visual environment than a person driving by the same area in a car or a person focused on launching a boat.

The duration of view was determined by reviewing the types of visitors at each KOP that were reported in Relicensing Study R-13 – *Recreation Surveys*, from observation over a period of time at KOPs, and from the type of place viewers observed the Project from. A 5-point scale was used to depict viewer sensitivity, with 1 representing low, 2

representing moderately low, 3 representing average, 4 representing moderately high, and 5 representing high sensitivity.

Effects of Project Facilities

The degree to which the aesthetic/visual character of the area seen from each KOP is affected by both Project and non-Project facilities is based on determining how Project facilities contrast with their surroundings in terms of scale, color, form, line, and texture. Noteworthy non-Project facilities that affect the aesthetic/visual environment were also described.

The influence of facilities on the aesthetic/visual environment near each KOP was described in terms of how the facility related to its surroundings in terms of scale, color, form, line, and texture. A 5-point scale was used to depict the relative influence of project facilities on aesthetic character, with 1 representing negative, 2 representing moderately negative, 3 representing neutral, 4 representing moderately positive, and 5 representing positive effect. If no Project facilities could be seen, the KOP was listed as Not Applicable (NA).

Effects of Project Operations

How is the aesthetic/visual character of the area from each KOP affected by Project operations such as seasonal reservoir drawdowns or frequent fluctuations (at Thermalito Forebay and Afterbay)?

The effects of operations were discussed in Section 4.2.1.2. For this evaluation, a 5-point scale was used to depict the relative effects of reservoir drawdowns, with 1 representing negative, 2 representing moderately negative, 3 representing neutral, 4 representing moderately positive, and 5 representing positive effect. If no Project facilities could be seen, the KOP was listed as Not Applicable (NA).

Lighting and Glare

Is Project related lighting visible from each KOP, and what effect does the lighting have on the aesthetic/visual environment?

Assessing glare from Project facilities and the effects of uncontrolled night lighting are CEQA requirements for aesthetic/visual resource assessment. During the day, glare from reflective materials can be visually distracting in the natural environment; at night the presence of uncontrolled light sources can cause light pollution which spreads light where it is not needed or desired and diminishes the visual quality of the night sky. This assessment was determined by observation while conducting site visits. A 5-point scale was used to depict the relative effect of Project related glare and night lighting, with 1 representing negative, 2 representing moderately negative, 3 representing neutral, 4 representing moderately positive, and 5 representing positive effect (positive scores

would only be given if measures had been taken to prevent glare [e.g., painting reflective material] or reduce light pollution [e.g., shading upward facing lights]). If there was no Project-related glare or night-lighting, the KOP was recorded as NA.

Scenic Vistas and Roadways

Does the portion of the Project represented by the KOP have an effect on a designated or eligible scenic highway?

This is also a CEQA requirement for aesthetic/visual resource assessment; if a project being evaluated falls within view of a designated scenic highway or is within a designated scenic vista, an evaluation of the effect of the project on the scenic highway or vista is conducted. For this study, the Oroville General Plan, Butte County General Plan, the California Department of Transportation (CalTrans) Scenic Highway Guidelines, and the Plumas National Forest Land and Resource Management Plan were reviewed to determine which designated scenic vistas and scenic highways/roadways would be influenced by the Project. It was determined that there are no State or County designated scenic highways in the study area, although several segments of highway have been zoned as Scenic Highways by the Butte County General Plan. The highways that are zoned by Butte County as scenic could potentially become State or County scenic roadways, so the influence of Project facilities and operations on these segments was noted. Part of Highway 70 that passes through the Project boundary is part of the Feather River National Forest Scenic Byway. A 5-point scale was used to depict the relative effect of Project related facilities and operation on those roadways, with 1 representing negative, 2 representing moderately negative, 3 representing neutral, 4 representing moderately positive, and 5 representing positive effect. If no Project facilities could be seen, the KOP was listed as Not Applicable (NA).

Opportunities

Are there opportunities to improve the aesthetic/visual environment of the portion of the Project represented by the KOP?

If there were opportunities for improving the aesthetic/visual environment of the portion of the Project seen from the KOP, the recommended actions were briefly described. Potential constraints to the opportunities were also briefly mentioned.

4.2.1.4 Summary

Appendix B contains detailed evaluations of each KOP based on the eight questions or concerns discussed above. At the end of each KOP evaluation is a summary table similar to Table 4.2-1 below. Section 6.1.4 summarizes the findings of the evaluations included in Appendix B in terms of the degree project facilities and operations effect the aesthetic/visual environment of each KOP.

Table 4.2-1. Evaluation summary at end of each KOP analysis.

Concern/Question	Type of Evaluation
1. Aesthetic/visual character	Brief description
2. Number of viewers	Low to high (1-5)
3. Sensitivity of viewers	Low to high (1-5)
4. Effects of Project Facilities	Negative to Positive (1-5)
5. Effect of Project operations (reservoir elevation)	Negative to Positive (1-5)
6. Negative Glare – Lighting	Negative to Positive (1-5) or NA
7. Influence on Scenic Vista/Highway	Negative to Positive (1-5) or NA
8. Opportunities and Constraints	List if applicable

Source: EDAW 2003

5.0 EXISTING AESTHETIC/VISUAL ENVIRONMENT

This section provides a description of the Project's existing aesthetic/visual environment. It begins in Section 5.1 with an overview of the aesthetic/visual environment of the region in which the Project is located. Section 5.2 includes a more detailed description of the study area by describing the aesthetic/visual environment of four sub-areas of the Project. Section 5.3 includes a review of policies, elements, standards, and guidelines that relate to aesthetic/visual resources in and near the Project.

5.1 AESTHETIC/VISUAL CHARACTERISTICS OF THE PROJECT REGION

The Oroville Project is located in Butte County north and west of the City of Oroville (see Figure 1.2-1). The western half of Butte County is situated along the eastern edge of the Central Valley. This area is primarily flat and land use consists largely of agricultural and developed/urban areas. The aesthetic/visual environment of this part of the County is dominated, or largely influenced, by human development and has a generally rural character. The agricultural areas in this part of the County include grazing and lands used for irrigated row crops and orchards. The Thermalito Forebay and Afterbay are located in this area.

The eastern half of the County begins in the foothills of the Sierra Nevadas and continues east to the mountain ranges steep upper slopes. This part of the County is largely undeveloped and retains much of its natural character, although there are areas of dispersed human activity and minor man-made modifications. The foothill area has a vegetative cover of chaparral and forests dominated by gray pine and blue oak. Higher elevations are steeper and more heavily wooded, including forests of fir and pine. Lake Oroville is located in this area.

The Project region contains numerous bodies of water and major rivers that greatly contribute to the aesthetic/visual character of the region. Major bodies of water in the greater Project region (within approximately 100 miles of the Project) include: Lake Shasta, Whiskeytown Lake, Lake Almanor, Stony Gorge Reservoir, East Park Reservoir, Clear Lake, Indian Valley Reservoir, Lake Berryessa, Folsom Lake, Englebright Reservoir, New Bullards Bar Reservoir, Antelope Lake, Lake Davis, Frenchman Lake, French Meadows Reservoir, and Hell Hole Reservoir. Major rivers in the general region include the Feather (which feeds Lake Oroville), Sacramento, Bear, American, Pit, and McCloud Rivers. Most of these rivers flow into reservoirs.

5.2 AESTHETIC/VISUAL CHARACTERISTICS OF THE PROJECT AREA

The Oroville Project encompasses approximately 41,100 acres and includes Oroville Dam and Reservoir, three power plants, Thermalito Diversion Dam, Feather River Fish Hatchery and Fish Barrier Dam, Thermalito Power Canal, OWA, Thermalito Forebay and Forebay Dam, Thermalito Afterbay and Afterbay Dam, transmission lines, and a number of recreational facilities. Due to its large size and the wide variety of settings

that it is located in, the Project has been divided into four sub-areas for this study: Lake Oroville, Thermalito Forebay and Diversion Pool, Thermalito Afterbay, and the LFC and OWA. Each of these sub-areas have distinctly different aesthetic/visual character and warrant separate description and discussion. The following describes the aesthetic/visual environment in which the four sub-areas are located. It does not describe Project facilities (other than water bodies). Project facilities are described in Section 6.1.1 (Effects of Project facilities).

5.2.1 Lake Oroville

When full (at elevation 900 ft), Lake Oroville covers 15,810 acres (nearly 25 square miles) and has 167 miles of shoreline. The reservoir is composed of five main “arms” or “branches” and the large, centrally located main basin. The five arms are known as the West Branch, the Upper North Fork Branch, the Lower North Fork Branch, the Middle Fork, and the South Fork. These arms range in width from as much as one mile in the lower portions of the Lower North Fork, to less than 100 ft in the upper reaches of the arms. The terrain adjacent to the arms is typically steep and the arms become narrow and canyon-like toward their upper reaches. Views in the straight parts of the arms can be extensive in distance (approximately 7 miles in the Lower North Fork), but are restricted in most areas by twisting terrain. In contrast, the main body of the reservoir affords wide open views of the surrounding landscape, such as Table Mountain to the west, the upstream face of Oroville Dam and Kelly Ridge to the south, South and North Bidwell Hills to the east (and parts of the Sierra Nevada Mountains beyond), and Mt. Rachel and the hills beyond it to the north.

Although there are scattered areas of concentrated development (mostly recreational) around the reservoir, most of the landscape viewed from and near the reservoir has an undeveloped, natural-looking appearance. The vegetation types that cover the hilly terrain surrounding the reservoir vary from grassland and brush in the lower parts of the reservoir to chaparral, oak woodlands, and coniferous forests in the upper portions. Generally, the vegetation is largely intact and undisturbed. The diverse vegetative communities help give different areas of the reservoir a variety of aesthetic/visual characteristics.

Due to steep topography and limited road access, much of Lake Oroville is not easily accessible to the public by land. The greatest number of people who view the reservoir up close are recreating at the reservoir’s major recreational facilities (the Lime Saddle Marina complex, the Spillway Boat Ramp [BR], the Bidwell Marina/ BR complex, and the Loafer Creek DUA/BR complex).

Another group of people who view Lake Oroville are the motorists who observe it when they drive over the bridges on Highway 162 (the Bidwell Bar Bridge), Highway 70, and Lumpkin Road.

In addition to recreationists and motorists, a third group of people who view the reservoir are the people who live near the Project. Most of these people are residents that live near Kelly Ridge and have views of the Loafer Creek area, the main body of the reservoir, and the Bidwell Bar Bridge area. Other areas that have scattered residential viewers are located along the South Fork (primarily near Enterprise), in the main basin near Canyon Creek, and along the west side of the upper reaches of the West Branch.

5.2.2 Thermalito Forebay and Diversion Pool

The Diversion Pool follows the river bed of the Feather River 5 miles from the Oroville Dam to the Thermalito Diversion Dam. The approximately 50 to 200-ft wide Diversion Pool has a riverine character as it meanders through thickly vegetated hillsides (Figure 5.2-1). Views within the Diversion Pool are confined and directed by the adjacent hillsides. Major visual features that can be observed in the vicinity of the Diversion Pool include: the downstream face of the Oroville Dam at the very upper end of the Pool, electric transmission lines (both Project and non-Project), an unpaved access road that parallels part of the right side of the Pool, railroad tracks that follow the left side of the Pool, the railroad bridge near the end of the Pool, and the Diversion Dam. Most viewers in this area are recreationists involved in activities such as walking, canoeing (and other non-motorized boating), wind-surfing, bicycle riding, and fishing. KOP TD-2 in Appendix A describes and illustrates the aesthetic/visual conditions of one location along the Diversion Pool.

From the Thermalito Diversion Dam, the 10,000-ft long Thermalito Power Canal connects the Diversion Pool to the Thermalito Forebay. It passes through flat grasslands and is adjacent to some residential areas. It is primarily seen by the public where Cherokee Road, Highway 70, and Table Mountain Boulevard cross over it.

The Thermalito Forebay begins at the west end of the Power Canal and extends approximately 3 miles southwest to the Thermalito Forebay Dam. The Forebay is an hourglass-shaped, 630-acre reservoir, just west of Highway 70 in the transition zone between the flat lands of the Central Valley and the more steeply sloped terrain of the foothills. The northwest edge of the Forebay is located just southeast of the Campbell Hills, while the remainder of it is situated in flat valley land. The downstream edge of the reservoir is formed by a low earthfill dam (91 ft high at its highest point) that extends for more than 3 miles along the Forebay's southern edge.

The hourglass shape of the reservoir results in two major segments, the North Forebay and the South Forebay (Figure 5.2-2). The majority of people who view the Forebay do so as recreationists from either of the two main recreation areas (the North and South Thermalito Forebay Recreation Areas), or as drivers from nearby transportation routes such as Highway 70, Nelson Avenue, or Grand Avenue. Given the relatively flat, open, grass covered terrain that the Forebay is located in, most of the views from around the Forebay are expansive. KOPs TD-3 (North Thermalito Forebay Recreation Area) and TD-4 (South Thermalito Forebay Recreation Area) illustrate the aesthetic/visual

conditions of two locations from where large numbers of people view the Forebay (Appendix A).

5.2.3 Thermalito Afterbay

The Thermalito Afterbay is the western most Oroville Project facility. The Afterbay is a 4,300-acre (6.7 square mile) reservoir located approximately 4½ miles west of the center of the City of Oroville, and is immediately east of State Highway 99. The reservoir is formed by a low earthfill dam with a maximum height of 39 ft. The dam extends for nearly 8 miles along the impoundment's western and southern edges, and has a very flat, level, and linear appearance. The north and east edges of the reservoir (and several islands) are defined by the surrounding rolling terrain and have an undulating, natural appearance.

Since the terrain that surrounds most of the Afterbay is either flat or rolling, and because the Afterbay is so large, views in this part of the Project are open and extensive (Figure 5.2-3). On clear days, the Sierra Nevada foothills can be seen from many parts of the Afterbay. Other major aesthetic/visual features include the dam (also known locally as the levee) to the west, south, and southeast (adjacent to the Feather River), the Feather River itself from areas along the southeast part of the Project, the Highway 162 (Oroville Dam Boulevard) causeway and bridge that cross the north part of the Afterbay from west to east (see Figure 5.2-4), Highway 99 (which is located west of the dam and next to Feather River Fish Hatchery Annex), several recreation areas (Monument Hill Recreation Site, Larkin Road Car-top BR, and the Wilbur Road Recreation Site), a few scattered residences, and parts of the undeveloped OWA (some of which are adjacent to the Afterbay and some of which can be viewed to the southeast from near the Afterbay outlet). Viewers of the Afterbay and of the landscape visible from the Afterbay area are quite varied. They include people participating in activities such as boating, swimming, picnicking, fishing and hunting, people driving past the project, and people viewing the Afterbay from some of the scattered residences in the area. KOPs TA-1 (Larkin Road DUA) and TA-2 (Monument Hill DUA) illustrate the aesthetic/visual environment of two of the most popular viewing areas of the Afterbay (Appendix A).

5.2.4 Low Flow Channel (LFC) and Oroville Wildlife Area (OWA)

5.2.4.1 Low Flow Channel (LFC)

The LFC is an approximately 14-mile length of the Feather River located east of the Thermalito complex. The upper portion of the LFC begins below the Diversion Dam and extends downstream through the City of Oroville where it leaves the Project boundary, above Bedrock Park. The LFC continues through the central part of the City of Oroville. Downstream of the Oroville Dam Boulevard West bridge, the LFC passes next to the Clay Pit State Vehicle Recreation Area (SVRA). It continues downstream next to, or through, the Project boundary and the OWA to a point adjacent to the Thermalito Afterbay outlet where water is released from the Afterbay into the river.

Insert Figure 5.2-1 and 5.2-2



Figure 5.2-1. Diversion Pool.



Figure 5.2-2. Middle of Thermalito Forebay at Nelson Road (South Forebay on left).

Back of Figure 5.2-1

Insert Figure 5.2-3 and 5.2-4

Back of Figure 5.2-3 and 5.2-4

The upper portion of the LFC below the Diversion Dam passes through the central part of the City of Oroville. Most of the area adjacent to this portion of the LFC is developed and includes Project facilities, the Feather River Nature Center, the Table Mountain Boulevard Bridge, scattered residences overlooking the LFC, and trails along the adjacent levee system (see Figure 5.2-5). People who view the upper part of the LFC include passing motorists, recreationists, and visitors to the Feather River Fish Hatchery.

The portion of the LFC below the main part of the City of Oroville is much less developed than the upper part. Much of the Feather River floodplain adjacent to the LFC, particularly along the lower portion, has been drastically altered. It is covered by coarse debris from the hydraulic mining era and mounded remains of dredge tailings, some of which were later used as material for the construction of Oroville Dam. The dredge tailings cover large areas and contain sinuous ridges of cobble, boulders, and gravel up to 40 ft in height. Various vegetation communities, such as riparian and oak woodlands, have become established throughout the area (Figure 5.2-6).

The extent of views from within and near the LFC are variable, due to adjacent topography, vegetation, and levels of development. Some areas have extensive open views of the LFC and other areas have restricted views. The majority of viewers see the upper portion of the LFC from areas near the City of Oroville. These areas include the levee and associated trail system, the Feather River Fish Hatchery complex, and the Feather River Nature Center. A number of people also have views of the LFC as they pass over it via bridges such as the Table Mountain Boulevard Bridge and the Table Mountain Bicycle Bridge. People who view the lower portion of the LFC do so from areas within the OWA, Highway 70, or the Thermalito Afterbay outlet (which is very popular with anglers), and other undeveloped access points (Figure 5.2-7).

5.2.4.2 Oroville Wildlife Area (OWA)

Although the OWA includes the Thermalito Afterbay, this discussion focuses on the main portion of the OWA that is south and east of the Afterbay. The OWA is composed of approximately 11,000 acres within the Project boundary that consists of a series of ponds, levees, mining tailings, and flat and low lying areas. The OWA is managed for wildlife and supports recreation. Within the OWA are designated and primitive campsites, a one-lane boat ramp, several unimproved ramps, and a number of roads in varying conditions. Views within the OWA are varied; in some portions, sparse vegetation and flat terrain allow for expansive views, while in other areas, vegetation and dredge tailings limit views considerably. Views within the main part of the Clay Pit SVRA (which is located within the OWA, but is not part of it) are more expansive due to the level nature of the area and the scarcity of shrubbery and trees in the main portion of the area. Most of the use in the OWA and Clay Pit SVRA is dispersed, and views of the areas occur throughout the areas. Two areas of relatively concentrated viewing are

the One-Mile Campground (Figure 5.2-7) area and the OWA Bird Viewing area, both of which are KOPs (Appendix A).

5.3 AESTHETIC/VISUAL RELATED POLICIES, ELEMENTS, STANDARDS, AND GUIDELINES

Several entities that have management responsibilities for lands within the study area also have policies, elements, standards, and guidelines for aesthetic/visual resources. Federal entities include the U.S. Forest Service (USFS) and the BLM. CalTrans is the State's entity that has review responsibility (for scenic highways) to insure compliance with the visual resource components of the CEQA. The California Department of Parks and Recreation (DPR) is responsible for managing Lake Oroville State Recreation Area (LOSRA) at the Project, but does not have specific visual regulations. Butte County has a Scenic Highways element of the General Land Use Plan and a Scenic Highways zoning designations. Several highways in the Project area have "Scenic Highway" zoning designations, but have not been designated as scenic highways by Butte County (see Section 5.3.4).

5.3.1 U.S. Forest Service (USFS)

USFS lands within the Project area are currently managed under the Plumas National Forest LRMP (USFS 1988). The LRMP was adopted in 1988 and guides the management of the approximately 1,618,500 acres of the Plumas National Forest and approximately 15,000 acres of the Lassen National Forest. The Plumas National Forest includes lands adjacent to the Project in the North Fork, Middle Fork, and South Fork branches of Lake Oroville. Lands in the Big Bend area are contained within Lassen National Forest, but are managed by Plumas National Forest and fall under the management direction of the Plumas LRMP.

The purpose of the LRMP is to help guide the USFS in the efficient use and protection of National Forest resources, fulfill legislative requirements, and balance local, regional and national needs. The LRMP establishes the management goals and policies that direct the management of the National Forest over 10 to 15 years (the "planning period") to help meet long term objectives over a 50 year period (the "planning horizon"). The LRMP also prescribes management practices for specified areas, and the time periods needed to obtain these objectives. In general, the policies for the land in the areas near the Project emphasize resource conservation, provision of high quality recreational opportunities, and protection of visual resources.

The LRMP uses the USFS Visual Management System (VMS) to manage the visual resources of the Plumas National Forest (USFS 1974). Visual resources throughout the National Forest have been inventoried and the management direction is reflected in terms of Visual Quality Objectives (VQOs). The VQOs represent a composite rating of the scenic integrity or visual variety of the landscape, combined with a sensitivity level

Insert Figure 5.2-5 – 5.2-7

Back of Figure 5.2-6 – 5.2-8

rating that can reflect the number and relative concern of viewers for the scenic quality of the landscape. Landscape variety and sensitivity levels are combined with a distance zone rating, which identifies the distance from which viewers typically experience the landscape. Based on inventory ratings and management direction, lands within the National Forest are assigned one of several VQOs. The USFS VQOs, listed from “most” to “least” aesthetically/visually protective are: Preservation, Retention, Partial Retention, Modification, and Maximum Modification. The following is a description of the VQOs (USFS 1974).

- *Preservation*: This VQO allows ecological changes only. Management activities, except for very low visual-impact recreation facilities, are prohibited.
- *Retention*: This VQO provides for management activities that are not visually evident. Under retention, activities may only repeat form, line, color, and texture that are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc. should not be evident.
- *Partial Retention*: Management activities are visually evident but subordinate to the characteristic landscape when managed according to the partial retention visual quality objective. Activities may repeat form, line, color, or texture common to the characteristic landscape, but changes in their qualities of size, amount, intensity, direction, pattern, etc. remain visually subordinate to the characteristic landscape.
- *Modification*: Under the modification VQO, management activities may visually dominate the original characteristic landscape. However, activities of vegetative and landform alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type.
- *Maximum Modification*: Management activities of vegetative and landform alterations may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type. When viewed as foreground or middle ground, they may not appear to completely borrow from naturally established form, line, color, or texture. Alterations may also be out of scale or contain detail that is incongruent with natural occurrences as seen in foreground or middle ground.

Based upon the Forest Plan’s map titled “Visual Quality Objectives for the Preferred Alternative”, USFS lands within the study area have been assigned two of the five possible VQOs (USFS 1988). These VQOs are Retention and Partial Retention. The Retention VQO has been applied to the USFS lands that follow corridors along the South Fork Feather River, the Middle Fork Feather River (into the Feather Falls Scenic Area), and Upper North Fork Feather River (Figure 5.3-1). USFS lands in the study area that are outside the areas with VQOs of Retention have been assigned a VQO of Partial Retention.

It is important to note that the USFS Visual Management System Handbook (USFS 1974) and the more current USFS Scenery Management System Handbook (USFS 1995), do not contain any discussion or guidance related to reservoir level changes and their resulting influences on VQOs or scenic quality. Therefore, the analysis of the effect of Project operations on the aesthetic/visual environment of the Lake Oroville area (including USFS managed lands) in Section 6.5.1 was conducted using professional judgment based upon the author's past experience performing visual assessments on FERC relicensing projects and a variety of projects for the USFS.

In addition to assigning VQOs, the LRMP has categorized all USFS lands into specific, distinct Management Areas. There are four Management Areas for Forest lands near the Project: Galen, French Creek, Kellogg, and Feather Falls. Each Management Area has general guidelines for achieving resource objectives along with specific standards and guidelines for managing the various resources such as visual resources, recreation, wildlife, and lands. Table 5.3-1 depicts general management direction relevant to aesthetic/visual resources in the study area and summarizes relevant standards and guidelines that relate to the aesthetic/visual environment.

In addition to the four Management Areas, there is also a National Forest Scenic Byway located in the study area. The Feather River National Forest Scenic Byway passes through the Plumas National Forest and the Project boundary. It begins at Highway 70 approximately 10 miles north of the City of Oroville and continues 130 miles through the Sierra Nevada mountains. The Byway is part of the National Forest Scenic Byway Program. The Byway designation is the umbrella term used for marketing the collection of 96 distinct and diverse roads designated by the U.S. Secretary of Transportation. America's Byways include the National Scenic Byways and All-American Roads. The Byway passes through the Project boundary (via a bridge) near the West Branch on lands that are not part of the USFS lands. USFS lands that the Byway passes through and that can be seen from the Byway are frequently assigned VQOs such as Retention and Partial Retention that protect the scenic qualities of the Byway.

5.3.2 Bureau of Land Management (BLM)

The BLM manages approximately 2,000 acres of land in scattered, noncontiguous parcels located along the West Branch, the Lower North, Middle, and South Forks of the Feather River, inside and outside of the Project boundary (see Relicensing Study L-2 – *Land Management Report*). The BLM is responsible for managing these scattered lands and their resources, including visual resources, under the direction of the 1993 Redding RMP. BLM lands in the Project area are located in a sub-area of the Ishi Management Area that is called the "Remainder of the Management Area". One of the primary management objectives of this sub management area is to transfer or exchange BLM lands in the Project area to qualified state/local agency(ies) or non-profit(s) via the Recreation and Public Purpose Act (R&PP). Until the transfers or exchanges have been completed, management of these lands is custodial in nature.

Insert Figure 5.3-1. National Forest Lands Visual Quality Objective (VQO) designations.

Back of Figure 5.3-1

Table 5.3-1. Standards and guidelines that apply to visual resources for Plumas National Forest management in the study area.

Management Area	General direction related to aesthetic/visual resources	Relevant standards and guidelines
Galen Management Area	None	None
French Creek Management Area	Maintain pleasing visual corridors.	Minimize the visual impact of transmission lines and hydroelectric facilities.
Kellogg Management Area	Protect and enhance recreation use of the Middle Fork of the Feather River.	Manage Scenic River Zone consistent with the Wild and Scenic Rivers Act.
	Protect unique scenic values.	Continue special management of Feather Falls Scenic Area; recommend designation of Feather Falls as a National Natural Landmark.
	Protect unique scenic and botanic values.	Preserve the champion ponderosa pine adjacent to the Hartman Bar Trail.
Feather Falls Management Area	Maintain pleasing visual corridors.	Apply Rx-10 (VQO of Retention) and Rx-14 (VQO of Partial Retention) to the Feather Falls and Forbestown viewsheds.
	Protect unique scenic values.	Continue special management of Feather Falls Scenic Area and employ Rx-3 (VQO of Retention).

Source: USFS (1988)

Visual resource management by the BLM is based on the agency's Visual Resource Management (VRM) system. As with the USFS VMS system, the VRM is a system that involves inventorying scenic values and establishing management objectives for those values through the resource management planning process. One component of the VRM is to assign visual resource "Inventory Classes" to parcels of land. There are four Classes, each of which has objectives that differ in terms of allowable changes to the visual conditions of those parcels of land. The four VRM Classes and their objectives are listed below.

- **Class I Objective:** To *preserve* the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention;
- **Class II Objective:** To *retain* the existing character of the landscape. The level of change to the characteristic landscape should be low;
- **Class III Objective:** To *partially retain* the existing character of the landscape. The level of change to the characteristic landscape should be moderate; and
- **Class IV Objective:** To provide for management activities which require *major modification* of the existing character of the landscape. The level of change to the characteristic landscape can be high.

The BLM lands in the Project area have been designated as Class II lands. This direction means that the visual character of lands in the Project that are anticipated to be transferred or exchanged will be retained by the BLM until the transfer is complete.

5.3.3 California Department of Transportation (CalTrans)

The California State Scenic Highway Program is part of the California Streets and Highways Code, which is administered by CalTrans. The goal of the Scenic Highway Program is to preserve and enhance the natural beauty of California. A nominated highway is evaluated by the extent to which the natural landscape is seen by passing motorists and the extent to which visual intrusions (e.g., buildings, unsightly land uses, noise barriers) affect the “scenic corridor.” More pristine routes with few visual intrusions are more likely to qualify as scenic. The extent to which intrusions, rather than the natural landscape, dominate views from the highway determines the significance of their impact on the scenic corridor.

A scenic corridor is the land generally adjacent to and visible from the highway. A scenic corridor is identified using a motorist’s line of vision. A reasonable boundary is selected when the view extends to the distant horizon. Jurisdictional boundaries of the land managers are also considered. Scenic highway status places no restrictions on making improvements to scenic highways, nor does it preclude development adjacent to the highways. CalTrans does, however, work with appropriate agencies to coordinate transportation proposals and maintenance activities and to ensure the protection of scenic corridors to the maximum extent possible. The only eligible State scenic highway in the Project area is a portion of Highway 70 north of the main basin of Lake Oroville. Being “eligible” indicates that the route is shown on the Master Plan of State Scenic Highways. This segment is not currently protected by a State-approved, county-developed plan.

5.3.4 Butte County General Plan

The Butte County General Plan was adopted in 1996 by Butte County and the Butte County Association of Governments. The purpose of the document is to provide a complete statement of the policies and intentions regarding future development of land over a planning horizon of 20 years, which extends to the year 2016. The General Plan contains twelve elements (such as Land Use, Circulation, Housing, etc.); the element that is relevant to this report is the Scenic Highways element. This element fulfills Section 65302(h) of the California Government Code to develop, establish, and protect scenic highways. Scenic highways are defined as a main public road through an area of picturesque natural landscapes. A scenic highway includes not only the pavement or traveled roadway, but also the entire publicly owned right-of-way. Customary accessory uses usually found in the right-of-way include bridges, drainage facilities, public utilities, walkways and trails, protective planting and landscaping, rest areas, and vista points.

The Scenic Highways Element has eight policies. They are:

- **Policy 1:** Protect valuable scenic areas for enjoyment by residents and visitors;
- **Policy 2:** Delineate scenic corridors with careful consideration of all factors;
- **Policy 3:** Consider scenic values in the design and improvement of rights-of-way;
- **Policy 4:** Control access to scenic highways to control safety;
- **Policy 5:** Locate and design utility structures to minimize visual impact, where economically feasible;
- **Policy 6:** Encourage compatible land use patterns in scenic corridors;
- **Policy 7:** Promote the County's scenic highways program; and
- **Policy 8:** Consider economic impacts on property affected by a scenic highway designation.

The primary objective of this element is the protection and enhancement of scenic areas adjacent to and visible from selected highways. As mentioned previously, in Section 5.3.3, Highway 70 north of Highway 149, is eligible as a State Scenic Highway, although not officially designated. A segment of this section of Highway 70 lies within the Project boundary where Highway 70 passes over the West Branch near Vinton Gulch.

The Butte County Zoning Plan has assigned the zoning designation of "Scenic Highway" (S-H) to portions of four roadways that are within the study area (Figure 5.3-2). These roadways have not been designated as S-H by the County, but are considered eligible for designation:

- Pentz Road (within the study area west of the West Branch);
- Highway 162 (along the east side of the main basin from the Canyon Creek area to south of the Bidwell Bar Bridge);
- Highway 70 (on the south side of the West Branch of Lake Oroville near Vinton Gulch); and
- Lumkin Road (at the east end of the South Fork).

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Insert Figure 5.3-2: Butte County Scenic Highway Zoning Designation.

Back of Figure 5.3-2

6.0 EFFECTS OF EXISTING PROJECT FACILITIES AND OPERATIONS ON THE PROJECT'S AESTHETIC/VISUAL ENVIRONMENT

A detailed description of how this evaluation was conducted is included in Section 4.2. This section includes an evaluation of the effects of the Project on the aesthetic/visual environment of each of the Project's four geographic subareas (Lake Oroville, the Diversion Pool and Thermalito Forebay, the Thermalito Afterbay, and the LFC/OWA). The effects of Project facilities and operations on the aesthetic/visual environment of each of the geographic areas were determined by examining the following topics:

- **General Effects of Project Facilities** – The presence of Project facilities can have a direct effect on the aesthetic/visual environment of areas within and near the Project. The evaluation of the influence of Project facilities on the aesthetic/visual environment consists of a general description of the influence of each major Project facility on each geographic area. A short description of the types of people who view the facility was included as well as their viewing sensitivity level. The distance from which the facility can be seen from sensitive viewing areas is described, as well as how the facility relates to its aesthetic/visual surroundings in terms of visual components such as scale, form, color, line, and texture;
- **General Effects of Project Operations** – Project operations (primarily the lowering and raising of Lake Oroville) can have an effect on the aesthetic/visual environment of areas within and near the Project. Descriptions of the effects of existing Project operations on the aesthetic/visual environment are included for each geographic area; and
- **Effect of Project Facilities and Operations on KOPs** – The effect of Project facilities and operations on the aesthetic/visual environment of each geographic area was also examined through the use of representative KOPs. A detailed analysis of the effects of Project facilities and operations on the aesthetic/visual environments of the KOPs is included in Appendix B. The effects of Project facilities and operations on the aesthetic/visual environment of the Project were rated as: positive effect, moderately positive effect, neutral effect, moderately negative effect, negative effect.

6.1 EFFECTS ON LAKE OROVILLE'S AESTHETIC/VISUAL ENVIRONMENT

6.1.1 Effects of Project Facilities

Table 6.1-1 briefly describes the visibility of Project facilities. More detailed descriptions are included in the text below.

6.1.1.1 Lake Oroville

Lake Oroville is a major regional aesthetic/visual element. At the reservoir's maximum operating storage capacity, the surface area of the reservoir is approximately 15,800

Table 6.1-1. General visibility and effect of Project facilities associated with Lake Oroville and the Oroville Dam.

Facility/General Effect	Comments	KOPs and Areas Facility Visible From
Lake Oroville Varies from Positive Effect to Negative Effect	Major aesthetic/visual element visible from recreation areas around Lake Oroville, Kelly Ridge residential area, other scattered residences, and several transportation routes.	<ul style="list-style-type: none"> • 14 KOPs scattered around the reservoir. • Developed and undeveloped recreation areas. • Kelly Ridge. • Highway 70 and bridge. • Highway 162 and bridge. • Lumpkin Road and bridge.
Oroville Dam Downstream face of Dam = Negative Effect Upstream face of Dam varies from Negative to Neutral Effect	<p>Earthfill structure approximately 1.3 mile long and 770 ft high.</p> <p>The 1.3-mile long, 770-ft high earthen dam is a significant visual element and regional landmark in the aesthetic/visual environment of the Oroville area.</p>	<ul style="list-style-type: none"> • KOP MR-4 (Foreman Creek Car-top BR). • KOP MR-6 (Bidwell Bar Bridge – Highway 162). • KOP MR-12 (Lake Oroville Visitors Center Tower). • KOP MR-13 (Oroville Dam Visitors Area – East Side). • KOP TD-1 (Oroville Dam Road). • Highway 70 and numerous areas throughout the general Oroville area.
Hyatt Power Plant Switching Station Moderately Negative Effect	Visible from crest of dam – white superstructures most visible elements of station.	<ul style="list-style-type: none"> • No KOPs. • Crest of dam. • Oroville Dam Boulevard.
Hyatt Equipment Yard Moderately Negative Effect	Light colored storage building very visible, cleared areas for storing materials also very visible.	<ul style="list-style-type: none"> • No KOPs. • Crest of dam. • Oroville Dam Boulevard.
Hyatt Generating Plant Transmission Lines Negative Effect	Transmission line consists of one 230-kV circuit that extends approximately 2.5 miles from Henry Hyatt Power Plant Switchyard to Table Mountain Substation.	<ul style="list-style-type: none"> • Cherokee Road. • Diversion Pool and access road. • Some residential areas of northern Oroville.
Hyatt Siphon Neutral Effect	Visible as green painted vertical element on west side of Kelly Ridge.	<ul style="list-style-type: none"> • Royal Oaks Drive along west side of Kelly Ridge.
Penstock Neutral Effect	Green painted penstock and right-of-way (ROW) briefly visible while driving on Oroville Dam Road.	<ul style="list-style-type: none"> • Oroville Dam Road.

Source: EDAW 2003

acres in size, with about 167 miles of shoreline. The straight line distance between the Oroville Dam and the farthest reaches of both the West Branch and Middle Fork is approximately 12 miles. Views of the reservoir are somewhat limited because it is situated in steep terrain. The main basin is the most visible part of Lake Oroville and is visible to recreationists using major recreation facilities located at Loafer Creek, Bidwell Canyon and Spillway, to motorists driving on Highway 162, and to the residents of Kelly Ridge. Parts of the West Branch are also visible to a variety of people. Viewers include people using recreation facilities such as those at the Lime Saddle complex and other smaller recreation access areas, and people driving on the Highway 70 bridge near Vinton Gulch. The Upper North Fork and Middle Fork are more remote than other areas of the reservoir and are viewed by fewer people. Due to difficult access, most people who view these areas of the reservoir do so from boats. The South Fork contains developed recreation access facilities and some scattered, low density residential areas exist in the general area. People driving over the Lumpkin Road Bridge also have views of the reservoir.

See Section 6.1.2 (Effects of Project Operations) for a summary of the effects of Lake Oroville on the aesthetic/visual environment.

6.1.1.2 Oroville Dam

The Oroville Dam is a massive earthfill structure that rises 770 ft above the floor of the Feather River Canyon and is approximately 1.3 miles in width along its crest (Figure 6.1-1). The face of the Dam is composed of gravel and rock, and supports some plant material such as annual grasses, forbs, and small shrubs. Most of the year the face of the Dam is brownish in color. The Dam's concrete and metal spillway, spillway control gates, and emergency spillway weir are located at the north end and are visually important elements of the Oroville Dam complex that contrast with the earth-filled portion of the dam. The visually prominent 178-ft wide concrete spillway chute extends from the top of the slope more than 3,000 ft down the spillway headworks and plunge pool at the canyon bottom (Figure 6.1-2). When the dam is spilling water into the spillway, mist from the water crashing into the spillway's base creates a spectacle that attracts viewers and media attention. Dramatic images of the spillway's turbulent waters and mists appear on local postcards and in local tourism literature.

Due to the sheer size of the dam and its southwest orientation toward the City of Oroville and the Central Valley, it is a prominent aesthetic/visual landmark. The most imposing views of the dam are from its crest. The two lane paved road and walking areas along the crest are used by people for driving, walking, and bicycling. People involved in these activities can look down upon the sloping face of the dam and out at the extensive vista beyond for long periods of time. Other areas that offer viewers relatively close foreground and middleground views of the face of the dam include Oroville Dam Boulevard in the Feather River canyon and portions of the reservoir upstream from the Dam. Areas from within and near the City of Oroville and some areas along Highway 70 have background views of the Dam. From these locations, the

Dam is seen as a large, linear feature on the face of the hills, whose horizontal lines and bare, light gray-brown surface contrast with the darker colors and more undulating lines of the vegetated foothill backdrop (Figure 6.1-3). The duration of viewing Oroville Dam from these areas ranges from very brief for motorists, to extended for people viewing the dam from their homes.

Regardless of where people see the Dam, it contrasts in scale, form, color, line, and texture with the surrounding aesthetic/visual environment of the Feather River canyon and surrounding hillsides. The spillway's light concrete color and vertical lines in particular contrast with the natural appearing canyon slope, making it highly visible in nearby views from the canyon. Despite its contrast with the natural environment, Oroville Dam is a regional land mark.

In summary, due to the degree of contrast with the surrounding landscape, the overall general effect of the Oroville Dam on the aesthetic/visual environment from which it is viewed from downstream or above (looking down on it) is negative. The effect of the upstream face of the dam varies from negative to moderately negative, to neutral depending on viewer distance to the dam.

6.1.1.3 Ancillary Facilities

Since the Edward Hyatt Power Plant is located in a cavern constructed underneath the reservoir, the Plant itself is not visible from around the dam. However, several of the features that are ancillary to the Power Plant, such as the switching station located at the base of the Dam, and a storage yard, located on land west of the Power Plant and above the river, have some degree of visibility, particularly when viewed from the crest of the Dam. Other components that are visible to the public include the penstocks (and it's cleared right-of-way), the siphon, and the two blue cylindrical structures that are part of the temperature control intake structure. The penstock has been painted a dark green and is briefly visible to drivers on the winding portion of Oroville Dam Boulevard. The siphon, which is located on a hill, has also been painted a dark green and is visible to people driving either Canyon Drive or Royal Oaks Drive and from some nearby Kelly Ridge residences. Painting both structures a dark green has reduced their visibility from some vantage points, although the siphon can be clearly seen rising above nearby vegetation. The temperature control intake structure is located along the shore of the reservoir and is quite visible from the crest of the dam, and the portion of the reservoir near the dam.

In summary, due to the relatively moderate degree of contrast with the adjacent landscape, the overall general effect of the ancillary facilities on the aesthetic/visual environment from which they are viewed is moderately negative.

Insert Figure 6.1-1. Aerial view of the dam.

Figure 6.1-2.

Figure 6.1-3.



Figure 6.1-1. Aerial view of the dam and ancillary facilities.



6.1-2. View of the Oroville Dam spillway from Oroville Dam Road.

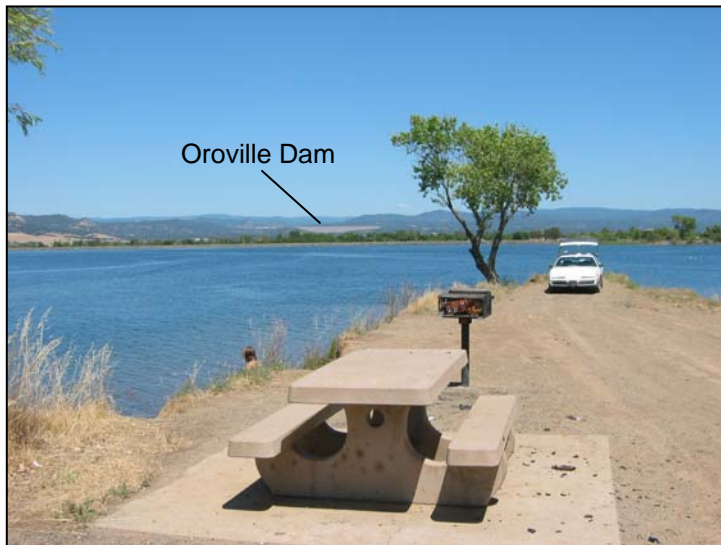


Figure 6.1-3. View of Oroville Dam from Thermalito Forebay (from South Forebay Recreation Area).

Back of Figure 6.1-1 – 6.1-3.

6.1.1.4 Transmission Lines

The transmission lines that connect the Hyatt Power Plant switchyard with PG&E's Table Mountain switchyard are discussed in Section 6.2.1.6.

6.1.2 Effects of Project Operations

The following discusses the effects of Project operations on the aesthetic/visual environment of the Lake Oroville area. It begins with a brief description of Project operations, discusses the general effects of reservoir drawdowns on the aesthetic/visual environment, and concludes with a summary of the effects of drawdowns on representative KOPs.

6.1.2.1 Background Operational Information

The following description of Project operations is based upon the Initial Information Package (IIP) (SWR 2001). Operations at Lake Oroville and the rest of the water storage components of the Project (the Thermalito Diversion Pool, Forebay and Afterbay) are planned and scheduled in concert with other SWP facilities downstream from the Project. The waters of the Project must meet multiple demands such as water supply, flood control, and hydropower production. The Project is an integral component of the flood control system for the surrounding area. During the winter, between October and March, the Project is operated under the flood control requirements of the USACE. The Project's flood control requirements result in lower pool levels at Lake Oroville in late winter and early spring, higher pool levels in the late spring through early summer as higher flows are stored in the reservoir, and declining levels in the late summer and fall as stored water is released from Lake Oroville.

Table 6.1-2 depicts average monthly reservoir pool elevations over a relatively long period of record (1968 to 2003) to illustrate the historic average pool elevations between April and October (when most people view Lake Oroville). It is important to note that this information is based on averages. The data does not differentiate between different water years. Each water year is different depending upon factors such as precipitation levels, seasonal temperatures, snowpack size, energy demands, and a variety of other factors.

On average, the reservoir refills during the spring and reaches an elevation of 857 ft by Memorial Day. This elevation is 43 ft below the full pool elevation of 900 ft. The reservoir stays at the 857 ft level through June and begins to decrease in elevation in July. On average, the elevation decreases to 840 ft in July, 823 ft in August, and 802 ft in September. These elevations are 60 ft, 77 ft, and 98 ft below full pool elevation. While average pool elevation data provides a reasonable overall characterization of a reservoir's average elevation over time, there are very few years that a reservoir's elevation is actually the same as the average elevation. At any given time, reservoir

**Table 6.1-2. Historic average monthly
Lake Oroville elevations.**

Month	Reservoir elevation
April	845 ft
May	857 ft
June	857 ft
July	840 ft
August	823 ft
September	802 ft
October	795 ft

Source: DWR 1968 to 2003 (based on daily average)

elevation is usually above or below the average, depending on a number of factors such as the amount and timing of precipitation within the Project's watershed. A better way to assess the aesthetic/visual effects of operations on a project is by examining exceedance data. Exceedance data indicates the probability that a specific pool elevation will be met or exceeded on a specific date, based on the historical record of reservoir pool elevations. For example, the historical data depicted in Table 6.1-3 indicates that there is a 90 percent chance of Lake Oroville meeting or exceeding an elevation of 775 ft in any given April. Table 6.1-3 also indicates that during any given April, there is a 50 percent probability that the elevation of Lake Oroville will meet or exceed an elevation of 875 ft, and a 10 percent probability that it will meet or exceed an elevation of 880 ft.

Table 6.1-3. Lake Oroville exceedance data.

Month	90%	50%	10%
April	775 ft	875 ft	880 ft
May	780 ft	880 ft	900 ft
June	775 ft	860 ft	900 ft
July	750 ft	825 ft	890 ft
August	715 ft	790 ft	880 ft
September	690 ft	775 ft	870 ft
October	680 ft	765 ft	875 ft

Source: DWR Supplied Data Dated 9/4/2003

The exceedance data displayed in Table 6.1-3 also indicates that April, May, and June would most likely have the highest reservoir elevations. There is a 50 percent likelihood that Lake Oroville would be within 25 ft of full pool in April, a 50 percent likelihood it would be within 20 ft of full pool in May, and a 50 percent likelihood it would be within 40 ft of full pool in June. The likelihood of Lake Oroville being within 20 ft of full pool in the summer months of June, July and August is 10 percent.

It is also possible to evaluate the likelihood of specific reservoir elevations occurring at various months in time by using exceedance data. This is useful for determining what the likelihood is that the visual conditions illustrated in the photographs in Figures 6.1-4, 6.1-5, and 6.1-6 and in Appendix A (that were taken at different reservoir elevations)

Insert Figure 6.1-4 a-c.



Figure 6.1-4a. Nelson Bar Car-top BR: Pool elevation = 900 ft.



Figure 6.1-4b. Nelson Bar Car-top BR: Pool elevation = 830 ft.



Figure 6.1-4c. Nelson Bar Car-top BR: Pool elevation = 710 ft.

Back of Figure 6.1-4a-c.

Insert Figure 6.1-5a-c.



Figure 6.1-5a: Bidwell Bar Bridge (Highway 162): Pool elevation = 900 ft.



Figure 6.1-5b: Bidwell Bar Bridge (Highway 162): Pool elevation = 830 ft.



Figure 6.1-5c: Bidwell Bar Bridge (Highway 162): Pool elevation = 710 ft.

Back of Figure 6.1-5a-c.

Insert Figure 6.1-6a-c.



Figure 6.1-6a. Loafer Creek BR: Pool elevation = 900 ft.

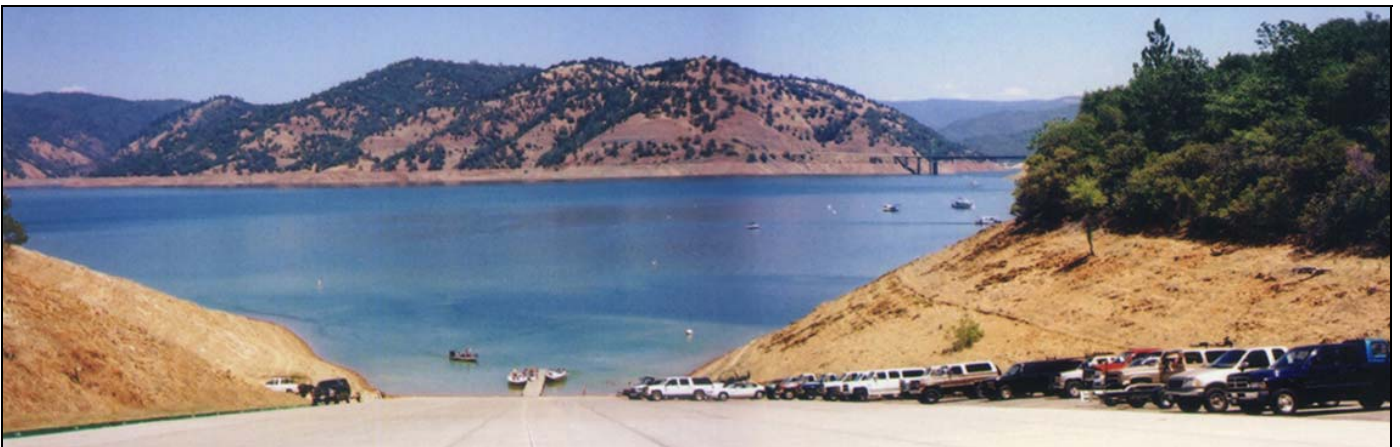


Figure 6.1-6b. Loafer Creek BR: Pool elevation = 830 ft.



Figure 6.1-6c. Loafer Creek BR: Pool elevation = 710 ft.

Back of Figure 6.1-6a-c.

would occur at various months in which they were taken. The series of photographs were taken in two different years at elevations of 900 ft, 830 ft, and 710 ft. Table 6.1-4 displays the exceedance data for each of the three elevations. Section 6.1.4 includes a discussion of the effects of the three elevations on the aesthetic/visual environment of areas seen from the Lake Oroville KOPs.

Table 6.1-4. Lake Oroville exceedance data at three elevations.

Month	Elevation 900 ft	Elevation 830 ft	Elevation 710 ft
April	0%	85%	95%
May	30%	80%	95%
June	25%	75%	95%
July	5%	45%	95%
August	5%	30%	95%
September	0%	30%	95%
October	0%	25%	95%

Source: EDAW 2003

The exceedance data in Table 6.1-4 indicates that the elevations that were photographed occur in various “types” of water years (i.e. “wet”, “normal” and “dry” years). Reservoir elevations that reach full pool (900 ft) are not common events and only occur during “wet” years. The likelihood of this occurring in any given year is only 30 percent in May and 25 percent in June. Therefore, the images of Lake Oroville at an elevation of 900 ft, as shown in the photographs, do not occur frequently. Conversely, a reservoir elevation of 830 ft has a good chance of being met or exceeded in April, May or June (85, 80 and 75 percent respectively). The images of Lake Oroville at an elevation of 830 ft have a good chance of occurring during most water years (85 to 75 percent). The photographs that were taken at elevation 710 ft represent images of Lake Oroville that occur very infrequently, during very dry years. The likelihood of an elevation of 710 ft being met or exceeded throughout the year in any given year is 95 percent. Even though this elevation occurs infrequently, it is important to include it in the analysis to have a “worst case” scenario example to analyze.

6.1.2.2 General Effects of Reservoir Elevation on the Aesthetic/Visual Environment of the Lake Oroville Area

Reservoir level is the most the important variable affecting the aesthetic/visual environment of the Lake Oroville area. When the reservoir is at or near its maximum operating storage level of 900 ft, it would be considered by most viewers to be at its most attractive. It is at this elevation that photographs used for Lake Oroville postcards and tourist brochures are generally taken, as they depict the waters meeting fully vegetated shorelines. As drawdown occurs during the course of the summer and fall, an increasingly broad ring of shoreline appears between the vegetated shoreline and the actual reservoir level. In some drawdown areas, old stream beds continue to receive some subsurface water so that the aesthetic effects of drawdown are lessened

by the presence of groundcover, trees, and shrubs along the streambeds that are able to survive periodic inundations.

In many areas along the shores of Lake Oroville, bare red and gray soil along with shoreline debris become exposed as the water level is lowered. This creates a drawdown zone that contrasts with the vegetated areas. This contrast is particularly noticeable in areas adjacent to the reservoir that have dense green vegetation. It is less noticeable in grass dominated areas that turn brown and do not have as much color contrast with the exposed shoreline as areas with dense green vegetation do. Large drawdowns can create conditions in which areas of the reservoir that are fully covered by water at higher elevations appear to be deep, red-sided canyons. During large drawdowns, the waters in some areas of the reservoir are altogether absent or only visible in the distance.

Reservoir drawdowns have a variety of effects on the aesthetic/visual environments of different parts of Lake Oroville. The parts of the reservoir that are most effected by drawdowns are the upper ends of the arms or branches. The Nelson Bar Car-top BR was chosen to represent these areas and is depicted in Figures 6.1-4a through 6.1-4c. At full pool (Figure 6.1-4a) the reservoir has a positive effect on the aesthetic/visual environment of the Nelson Bar Car-top BR (see Section 6.1.4.2 for a discussion on the effects of the reservoir elevations on specific KOPs). As reservoir elevations are lowered, they can have dramatic effects in areas located in the upper branches or arms. These areas tend to be narrow and steep, so drawdowns can expose significant amounts of vertical shoreline. In addition, these areas are generally the shallowest parts, thus drawdowns can result in the arms or branches becoming dewatered, resulting in a negative effect on the aesthetic/visual environment of areas. For example, a reservoir elevation of 830 ft at an area like the Nelson Bar Car-top BR has a moderately negative effect on the aesthetic/visual environment because of extensive exposed vertical shoreline (Figure 6.1-4b). An elevation of 710 ft has a negative effect on the aesthetic/visual environment of the Nelson Bar Car-top BR because of the exposed vertical shoreline and the dewatering of the immediate area (Figure 6.1-4c).

Drawdowns also expose shoreline in the main basin of the reservoir, but to a lesser degree than in the upper arms or branches. As in other areas, a full reservoir has a positive effect on the aesthetic/visual environment as illustrated in Figure 6.1-5a (the Bidwell Bar Bridge [Highway 162]). In steep portions of the main basin, such as the area near the Bidwell Bar Bridge, drawdowns can expose a considerable amount of vertical shoreline, similar to the upper arms or branches. Unlike the upper arms or branches however, steep areas of the main basin of Lake Oroville are deep, so they do not become dewatered. At an elevation of 830 ft (Figure 6.1-5b) some vertical shoreline is exposed, but relatively little horizontal shoreline is. At this location, a drawdown to an elevation of 830 ft barely has a moderately negative effect. Even greater drawdowns in these kinds of areas do not have as much of a negative effect as in shallower areas. Figure 6.1-5c depicts the Bidwell Bar Bridge area at an elevation of 710 ft; the effect of

this elevation is considered to be moderately negative and is less severe than in the upper arms of branches or shallower areas of the main basin.

Shallower areas of the main basin, such as Loafer Creek BR, can have considerable amounts of vertical and horizontal shoreline exposed during drawdowns. Drawdowns also expose the boat ramp, a significant aesthetic/visual element at this location, which is essentially hidden at full pool (Figure 6.1-6a). An elevation of 830 ft results in a moderately negative effect, due to the presence of the shoreline adjacent to the boat ramp (Figure 6.1-6b). At an elevation of 710 ft, the water of the reservoir is quite far away and a significant amount of horizontal shoreline is exposed (Figure 6.1-6c). This elevation has a negative effect on aesthetic/visual quality.

In summary, at most locations around Lake Oroville, a full reservoir elevation has a positive effect on the aesthetic/visual environment of areas from which the reservoir can be viewed. At mid-range elevations such as those represented by an elevation of 830 ft, the amount of shoreline exposed results in a moderately negative effect on the aesthetic/visual environment. At extreme low reservoir elevations, such as those represented by an elevation of 710 ft, the amount of shoreline exposed has a negative effect on the aesthetic/visual environment.

6.1.3 Recreation Visitor Survey Responses Pertinent to Reservoir Elevations at Lake Oroville

Part of Relicensing Study R-13 – *Recreation Surveys* consisted of a visitor survey. Most of the questions in the survey were oriented towards collecting data relevant to recreation, but some of the questions also provided information related to the Project's aesthetic/visual environment. The study consisted of 1,276 on-site surveys and 858 follow-up mail-in surveys, which were sent to all of the on-site respondents who provided their address. The data gathered provided information related to seasonal use patterns, visitor/viewer activities, levels of satisfaction, why some recreationists/viewers were dissatisfied with the Project, aesthetic/visual issues that are of concern to some recreationists/viewers, and recreationists/viewers perception of scenic quality at various recreation areas. All of these topics are of use for determining visitor perceptions related to the aesthetic/visual environment of the Project.

6.1.3.1 Visitation Patterns

Visitation patterns are important to understand because they indicate when people view the Project and in the case of Lake Oroville, what the general pattern of reservoir elevations is relative to visitation. The survey asked respondents to identify when they had visited the Lake Oroville area during the previous year. The data collected were grouped by season (the survey did not define the months that constituted each season, so the interviewees were asked to identify the seasons as they chose) (Table 6.1-5).

Table 6.1-5. Seasonal visitation patterns.

Season	Percent
Spring	55
Summer	89
Fall	41
Winter	29
Total Respondents = 204	

Source: EDAW 2003

Nearly 90 percent of the respondents reported visiting the Project during the summer, making it the most popular season to visit. The respondents reported less visitation during the spring, fall and winter. Approximately 55 and 40 percent of the respondents reported visiting the Project during the spring and fall, respectively. As expected, winter received the least visitation, with 29 percent of the respondents reporting visiting the Project during this season.

The exceedance level data presented in Section 6.1.2.1 indicates that reservoir elevations are more likely to be higher during the late spring and early summer and lower during the winter. Although reservoir elevations are usually lowered through the summer, it is interesting to note that visitation during the summer season is high, despite the lower elevations towards the end of summer.

6.1.3.2 Primary Activities

People recreating at Lake Oroville participate in a wide variety of activities and view the Project from various areas. As indicated in Table 6.1-6, many of the activities identified in the survey occurred in or near the water (e.g., bankfishing, swimming, motorboating, etc.). This means that many people view the Project from the water (on boats) and as they enter and leave the water at facilities such as boat ramps and marinas. Most of the other activities that were identified by the respondents occur on land in areas from which the water and land of the Project are frequently visible.

Table 6.1-6. Primary recreational activities at the Oroville Project.

Activity	Percent
Bank fishing	15%
Swimming	10
Motorboating	10
Boat fishing	10
Water skiing/wakeboarding	9
Relaxing	5
Personal watercraft	4
Horseback riding	4
Tent camping	3
Houseboating	3
Picnicking	3
Total Respondents = 2,365	

Source: EDAW 2003

6.1.3.3 Satisfaction with Last Visit

The respondents were asked to estimate the overall degree of satisfaction they had on their most recent visit to the Lake Oroville area (Table 6.1-7). Although the overall satisfaction rating of the respondents does not necessarily have a direct correlation with their perception of the quality of the aesthetic/visual environment of Lake Oroville, it can be assumed that the aesthetic/visual environment does have some influence on overall satisfaction. Respondents that were not satisfied with their previous visit, did identify specific things that they did not like, including some that are related to the Project's aesthetic/visual environment. Most respondents reported that they were satisfied with their last visit. Approximately 76 percent of the respondents stated that they had been "somewhat", "very" or "extremely" satisfied. Approximately 4 percent of the respondents reported being "neither satisfied nor dissatisfied" with their visit, while 16 percent reported that they were either "somewhat dissatisfied," "dissatisfied," "very dissatisfied," or "extremely dissatisfied" with their visit.

Table 6.1-7. Satisfaction with last visit to the Lake Oroville area.

Degree of Satisfaction	Percentage of Respondents
Extremely dissatisfied	3%
Very dissatisfied	5
Dissatisfied	3
Somewhat dissatisfied	5
Neither dissatisfied or satisfied	4
Somewhat satisfied	8
Satisfied	30
Very satisfied	29
Extremely satisfied	9
Missing	4
Total Respondents = 1,071	

Source: EDAW 2003

People who filled out the mail survey were given the opportunity to add unsolicited "additional comments". Comments that were categorized as negative included the reservoir level being too low (17 percent), effects of water quality (11 percent), maintenance issues (18 percent), access and facilities (28 percent), and fishing (31 percent) (Table 6.1-8). Among these respondents, dissatisfaction related to reservoir elevation seemed to be less of a concern than other negative items.

6.1.3.4 Problems Encountered During Last Visit

All of the visitors who received the mail-in survey were also presented with a list of 25 potential issues or conditions that they might have considered to be problems during their last visit to Lake Oroville. Several of the issues or conditions the visitors were

Table 6.1-8. Comments that were categorized as showing dissatisfaction with aspects of their visit to the Lake Oroville area.

Comments	Percent
Lake too low	17%
Effects of water	11%
Negative maintenance issues	18%
Negative comments about access & facilities	28%
Negative comments on fishing	31%
Total Respondents = 687	

Source: EDAW 2003

asked to comment on related to aspects of the aesthetic/visual environment of the Project.

When asked to identify issues or conditions at the Project that could potentially be “a slight, moderate, or big problem” that related to the aesthetic/visual environment of the Project, several were identified by respondents (Table 6.1-9). Approximately 52 and 49 percent of the respondents respectively reported that land and shallow areas exposed during low water levels could be considered a big problem. Approximately 45 percent reported that water level fluctuations could be a problem. Approximately 30 and 36 percent of those who returned the mailers said that exposed land and shallow areas were not a problem. Issues related to litter, floating debris, and sanitation were identified by between 45 and 29 percent of the respondents as potentially being a problem. When prompted to comment on issues related to aesthetic/visual quality, approximately half of the mail-in respondents felt that exposed land and shallow areas at the Project (all of the Project facilities) are problems of varying magnitudes.

Table 6.1-9. Perceptions of issues or conditions identified by respondents after being specifically asked to identify “problems” during their last visit to the Lake Oroville area.

Issue	Percent Identified as a Slight, Moderate, or Big Problem	Percent Identified as Not a problem
Exposed land during low water levels	52%	30%
Water level fluctuation	45	36
Shallow areas during low water levels	49	32
Litter along the shoreline	45	45
Floating debris in the water	38	46
Sanitation along the shoreline	29	57
Quality of water	24	61
Total Respondents =1,071		

Source: EDAW 2003

6.1.3.5 Perception of Scenic Quality at Recreation Areas

In regards to the quality of the scenery at the recreation area where they were surveyed, survey respondents were asked to rate it on a 9-point scale, with “1” being “extremely unappealing” and “9” being “extremely appealing” (Table 6.1-10).

Approximately 75 percent of the respondents rated the setting of the recreation area where they were interviewed as being between “Appealing” and “Extremely Appealing”. Approximately 14 percent gave a rating of 5 (which was slightly below “Appealing”) and 12 percent found the recreation area where they were surveyed to be unappealing to varying degrees.

Table 6.1-10. Perceptions of scenic quality at recreation areas.

Perception	Percent
1 - Extremely Unappealing	2%
2 -	1%
3 - Unappealing	4%
4 -	5%
5 -	14%
6 - Appealing	34%
7 -	17%
8 -	8%
9 – Extremely Appealing	16%
Total Respondents =2,583	

Source: EDAW 2003

6.1.3.6 Conclusions From the Survey

The survey clearly showed that most visitors (75 percent) to Lake Oroville were generally satisfied with the experience and were generally satisfied with the scenic quality of the recreation area where their survey took place. Because most visitation occurs during the summer, when reservoir elevations are typically receding from the years highest elevations, most visitors that participated in the survey would have viewed a reservoir with some degree of exposed shoreline, yet were still satisfied with their visit. However, exposed shoreline, shallow areas, and reservoir fluctuations were identified as potential problems by approximately half of the mail-in survey respondents when given a list of potential problems.

Although reservoir elevations do have a direct influence on the Project’s aesthetic/visual environment, the results of this survey indicate that when not specifically asked about issues related to reservoir elevation, most respondents (75 percent) were satisfied with their experience. This conclusion is not to say that reservoir elevations do not influence perceptions of aesthetic/visual quality. However, other factors related to recreational activity and the Project areas other positive visual attributes such as the water of the reservoir, adjacent hills and mountains, twisting narrow canyons, and vegetation may “override” potential negative attributes associated with exposed shoreline at some elevations.

6.1.4 Effects of Project Facilities and Operations on the Aesthetic/Visual Environment of Relevant KOPs at Lake Oroville

This section briefly discusses the effects of Project facilities and operations on the aesthetic/visual environment of the 14 KOPs that were selected based on represent views from around Lake Oroville. Table 6.1-11 summarizes the effects, while Appendix B contains detailed evaluation forms for each KOP. Appendix A contains text and photographs that further describe/illustrate the aesthetic/visual environment of each of the KOPs, and identifies Project facilities that can be seen from the KOPs.

Table 6.1-11. Summary of effects of Project facilities on the aesthetic/visual environment of areas seen from KOPs around Lake Oroville.

KOP	Facility and Effect	Notes
KOP MR-1 – Nelson Bar Car-top Boat Launch	None seen	
KOP MR-2 – Lime Saddle Boat Launch	None seen	
KOP MR-3 – Lime Saddle Peninsula	None seen	
KOP MR-4 – Foreman Creek Car-top Boat Launch	Dam = neutral effect	The upstream face of the dam is seen in the background.
KOP MR-5 – Canyon Creek Bridge	None seen	
KOP MR-6 – Bidwell Bar Bridge on Highway 162	Dam = neutral effect	The upstream face of the dam is seen in the background.
KOP MR-7 – Stringtown Car-top Boat Launch	None seen	
KOP MR-8 – Bidwell Canyon Boat Launch	None seen	
KOP MR-9 – Bidwell Canyon Marina	None seen	
KOP MR-10 – Bidwell Canyon Cove to South	None seen	
KOP MR-11 – Loafer Creek Boat Launch	None seen	
KOP MR-12 – Lake Oroville Visitors Center Tower	Dam and facilities = moderately negative effect	The top of the dam and facilities seen in middleground.
KOP MR-13 – Oroville Dam Visitors Area (East Side)	Dam = negative effect	Dam seen in foreground.
KOP MR-14 – Spillway Boat Launch	Dam = negative effect	The upstream face of the dam seen in foreground.
KOP TD-1 – Oroville Dam Road	Dam = negative	The downstream face of the dam seen in foreground.
Total	None Seen = 9 Dam = 2 Neutral Dam = 2 Moderately Negative Dam = 3 Negative	

Source: EDAW 2003

6.1.4.1 Project Facilities

Project facilities related to power generation and/or transmission are concentrated at the downstream portion of the reservoir and are not visible from most parts of Lake Oroville or from most of the Lake's representative KOPs. Project facilities can be seen from 6 of the 15 KOPs listed in Table 6.1-11 and have varying effects on the aesthetic/visual environment. The following briefly describes the effects on each of the five KOPs at Lake Oroville from which Project facilities can be seen.

The upstream side of the Oroville Dam has a neutral effect on the aesthetic/visual environment of areas seen from KOP MR-4 (Foreman Creek Car-top BR) and KOP MR-6 (Bidwell Bar Bridge on Highway 162). Although the upstream face of the Oroville Dam is visible in the background from both of these KOPs, it appears as a relatively minor flat object on the horizon. Due to the short viewing duration when driving along Highway 162 and when launching boats at Foreman Creek, the sensitivity of viewers at these KOPs is not high. Therefore, the presence of the Dam has a neutral effect on the aesthetic/visual environment as seen from these two KOPs.

Oroville Dam has a moderately negative effect on KOP MR-12 (Lake Oroville Visitors Center Tower). The tower is used by visitors to view the Project and the surrounding area, thus viewer sensitivity is high. The upstream face of the Dam and its crest are in the middleground, and the Dam is seen as a long linear feature that contrasts in form, line, color, and shape with the undulating vegetated hills visible behind it and adjacent to it. The downstream face of the dam has a moderately negative effect on KOP TD-1 (Oroville Dam Road), which represents views from along Oroville Dam Road.

Due to the close proximity of Oroville Dam to KOP MR-13 (Oroville Dam Visitors Area - east side) and KOP MR-14 (the Spillway BR), the dam has a negative effect on the aesthetic/visual environment of these two KOPs. From KOP MR-13, the southeast side of the upstream portion of the Dam dominates the view and the temperature control intake structure can be seen to the north. From KOP MR-14, the northwest end of the Dam is highly visible when viewed from this KOP. The dam contrasts in scale, form, line, and color with the surrounding areas visible from these KOPs.

In summary, Project facilities are not seen at nine KOPs. The dam is seen but has a neutral effect on two KOPs, a moderately negative effect on two KOPs, and a negative effect on two KOPs.

6.1.4.2 Project Operations

The following describes the effects of the three representative pool elevations on the aesthetic/visual environment of the 14 KOPs located in various parts of Lake Oroville. As discussed in Section 6.1.2.1, the three elevations are 900 ft (full pool), 830 ft, and 710 ft.

Photographs from the relevant KOPs at the two representative elevations below full pool are included in Appendix A. Photographs of three of the KOPs at all three elevations are included in Figures 6.1-4, 6.1-5, and 6.1-6. By comparing the three reservoir elevations used for analysis with the exceedance data discussed in Section 6.1.2.1, the probability of the three elevations occurring can be determined. This information gives an idea of how likely the representative scenes in the figures would occur in a particular month. For example, the photographs that were taken at an elevation of 830 ft represent conditions that could occur at various months. During April for example, there is an 85 percent probability that the reservoir would meet or exceed this elevation. By September, the probability would decrease to 30 percent.

The following describes the three representative elevations that are used to evaluate the effects of reservoir drawdowns on the aesthetic/visual environment of the 14 KOPs at Lake Oroville. Table 6.1-12 includes a summary of the effects of the three elevations.

Table 6.1-12. Summary of effects of reservoir elevation on the aesthetic/visual environment of areas seen from KOPs around Lake Oroville.

KOP	Full Pool (900 ft)	Elevation 830 ft	Elevation 710 ft
KOP MR-1 – Nelson Bar Car-top BR	Positive	Moderately Negative	Negative
KOP MR-2 – Lime Saddle BR	Moderately Positive	Moderately Negative	Negative
KOP MR-3 – Lime Saddle Peninsula	Positive	Moderately Negative	Negative
KOP MR-4 – Foreman Creek Car-top BR	Positive	Moderately Negative	Negative
KOP MR-5 – Canyon Creek Bridge	Positive	Moderately Negative	Negative
KOP MR-6 – Bidwell Bar Bridge on Highway 162	Positive	Moderately Negative	Moderately Negative
KOP MR-7 – Stringtown Car-top BR	Positive	Neutral	Negative
KOP MR-8 – Bidwell Canyon BR	Positive	Moderately Negative	Negative
KOP MR-9 – Bidwell Canyon Marina	Moderately Positive	Neutral	Negative
KOP MR-10 – Bidwell Canyon Cove to South	Moderately Positive	Neutral	Negative
KOP MR-11 – Loafer Creek BR	Positive	Moderately Negative	Negative
KOP MR-12 – Lake Oroville Visitors Center Tower	Positive	Neutral	Moderately Negative
KOP MR-13 – Oroville Dam Visitors Area (East Side)	Positive	Neutral	Negative
KOP MR-14 – Spillway BR	Positive	Moderately Negative	Negative
Total	Positive =11 Moderately Positive = 3	Neutral =5 Moderately Negative =9	Moderately Negative =2 Negative =12

Source: EDAW 2003

Full Pool – 900 Ft

Full pool (elevation 900 ft) is not a common occurrence at Lake Oroville. As displayed in Table 6.1-4, full reservoir elevations most frequently occur in May, but still do not occur very frequently. Based on exceedance level data, the likelihood of Lake Oroville being at, or exceeding, an elevation of 900 ft in any given May is approximately 30 percent. The photographs in Figures 6.1-4a, 6.1-5a, and 6.1-6a taken to represent this elevation were taken in mid-May of 2003.

At full pool, the water of the reservoir completely covers all of the shoreline of Lake Oroville to the vegetation line and, in some areas, above it. Shoreline debris, such as tree stumps, and exposed features, such as rock outcroppings, that are exposed at lower pool elevations are submerged at full pool. Full pool elevations can have a somewhat temporary negative effect at some locations because trash and other floating debris that collects along exposed shorelines at lower pool elevations is carried with the rising pool and can be deposited along the high pool elevation shoreline in adjacent vegetation.

In summary, a full reservoir elevation has a positive effect on the aesthetic/visual environment of views from all 14 Lake Oroville KOPs.

Elevation 830 ft

Lake Oroville reaches or exceeds this elevation with great regularity during the spring months. The likelihood of this elevation being met or exceeded in April, May, or June is approximately 85, 80, and 75 percent respectively. During the summer months, the likelihood of this elevation being met or exceeded is less, approximately 45, 30, and 30 percent in July, August, and September, respectively. The photographs that are used to represent this elevation that are depicted in Figures 6.1-4b, 6.1-5b, and 6.1-6b, which were taken in mid-June of 2002.

At this reservoir elevation, nine KOPs are affected in a moderately negative fashion due to exposed shoreline. At elevation 830 ft, the exposed shoreline at many locations becomes a primary part of the scenery, but does not dominate the scene. An example is KOP MR-1 (Nelson Bar Car-top BR) where the shoreline and the waters of the reservoir are the two major parts of the viewed scene; when the shoreline is exposed, it commands viewer attention. Five KOPs are affected in a neutral fashion at this elevation. These KOPs have visual complexity in their observed areas such that the reduction in pool elevation does not draw as much viewer attention as with other KOPs.

An example is KOP MR-9 (Bidwell Canyon Marina) where boats and marina facilities command as much viewer attention as the exposed shoreline does at this elevation.

In summary, a pool elevation of 830 ft has a moderately negative effect on the aesthetic/visual environment of 9 of the 14 KOPs and a neutral effect on the remaining five.

Elevation 710 ft

An elevation of 710 ft is almost 200 ft below full pool. Based on exceedance data, the chance of this elevation being reached or exceeded for any month between April and October is 95 percent, which conversely means that the likelihood of this elevation being even lower or met in any given month, below April and October, is approximately 5 percent. Reservoir elevations that are this low generally only occur during the fall of very dry water years. The photographs taken to represent the elevation depicted in Figures 6.1-4c, 6.1-5c, and 6.1-6c were taken in late October of 2002 at the end of a dry water year.

At this elevation, a considerable amount of shoreline is exposed at all KOPs. At KOPs located in some of the upper reaches of the reservoir, such as KOP MR-5 (Canyon Creek Bridge), and in some of the shallower areas, such as KOP MR-4 (Foreman Creek Car-top BR), the waters of the reservoir can barely be seen. As a result, 12 of the 14 KOPs are effected negatively at this elevation. The remaining two (KOP 6 Bidwell Bar Bridge and KOP 12 Lake Oroville Visitors Center Tower) have a moderately negative rating, because from these KOPs a large amount of the Project is visible in the distance and the exposed shoreline is not as noticeable to viewers.

In summary, a pool elevation of 710 ft has a negative effect on the aesthetic/visual environment of all but 2 of the 14 KOPs; it has a moderately negative effect on the remaining two.

6.2 THERMALITO DIVERSION POOL, DIVERSION DAM, AND FOREBAY

Section 5.2.2 includes a description of the physical characteristics of the Thermalito Diversion Pool, Diversion Dam, Forebay, and Forebay Dam, along with major views, major visual features, and a brief description of the areas primary viewers. This section includes a general discussion of the effects that Project facilities and operations associated with the Thermalito Diversion Pool, Diversion Dam, Forebay and Forebay Dam have on the aesthetic/visual environment of areas from which they can be seen. It concludes with a discussion of how Project facilities and operations effect the aesthetic/visual environment of three representative KOPs. Table 6.2-1 describes the general visibility of Project facilities associated with the Thermalito Diversion Pool, Dam, and Forebay.

Table 6.2-1. General visibility and effect of Project facilities associated with the Thermalito Diversion Dam and Pool.

Facility/General Effect	Comments	KOPs and Areas Facility Visible From
Thermalito Diversion Pool Moderately Positive Effect	A long, (approximately 4.5 miles) narrow pool that has a riverine appearance and little fluctuation, seen from relatively few areas.	<ul style="list-style-type: none"> • KOP TD-2 (Diversion Pool) • Access road • Cherokee Road
Thermalito Diversion Dam and Diversion Dam Pump Generating Plant Moderately Negative Effect and Neutral	The 625-ft long and 143-ft high dam is visible in a very limited area, primarily looking downstream from Diversion Pool and looking upstream from portions of the LFC near Feather River Fish Hatchery and Feather River Nature Center.	<ul style="list-style-type: none"> • KOP BR-1 (Feather River Nature Center) • Cherokee Road • Diversion Pool and access road • Feather River Fish Hatchery • Feather River Nature Center • Some residential areas of northern Oroville
Thermalito Power Canal Negative Effect	The 10,000 ft long, straight concrete lined canal and adjacent chain link fence is visible to the public primarily from three overpasses that cross over it.	<ul style="list-style-type: none"> • No KOPs • Cherokee Road Overpass • Table Mountain Overpass • Highway 70 Overpass • Limited areas in north Oroville
Thermalito Forebay Moderately Positive Effect	The Forebay is an hourglass shaped, 630-acre reservoir that is most visible from two recreation areas and several transportation routes.	<ul style="list-style-type: none"> • KOP TD-3 (North Forebay Thermalito Recreation Area) • KOP TD-4 (South Thermalito Forebay Recreation Area) • Highway 70 • Nelson Ave • Grand Ave
Thermalito Forebay Dam Neutral Effect	The 8-mile long, 91-ft high Dam is visible throughout the South Forebay. Visible from several transportation routes, and KOPs in the distance.	<ul style="list-style-type: none"> • KOP TD-4 (South Thermalito Forebay Recreation Area) • Highway 70 • Nelson Ave • Grand Ave.
Transmission Lines from Edward Hyatt Power Plant Negative Effect	Two lines of double circuit towers carrying three 230kv circuits extend approximately 9 miles, from Hyatt Power Plant switchyard to the Table Mountain Substation. Approximately 2.5 miles of transmission line can be seen in the Project area.	<ul style="list-style-type: none"> • KOP TD-2 (Diversion Pool) • Diversion Pool & access road • Oroville Dam Boulevard • Cherokee Road • Table Mountain Road and some areas of northern Oroville

Source: EDAW 2003

6.2.1 Effects of Project Facilities

6.2.1.1 Diversion Pool

The 4.5 mile long Diversion Pool is located in an area that has limited visibility to the public. However, the Pool is highly visible from the hiking and bike trails that border it on both sides, from the equestrian trail along its southern edge, from the unpaved access road that runs along the west side of it (and the Diversion Pool DUA), and from parts of Cherokee Road. The openness of the Pool allows viewers to see the nearby forested, steep canyon walls. The Diversion Pool's stable elevation, calm water, quiet environment, and relatively remote location are unique to the area. At times, when water is being released from Oroville Dam into the Oroville Dam Spillway, spectacular views of the water rushing down the Spillway can be seen from areas near the Diversion Pool.

In summary, the pool has a moderately positive effect on the aesthetic/visual environment of areas near it from which it can be viewed (see Section 6.2.2).

6.2.1.2 Thermalito Diversion Dam

The upstream face of the 625-ft long Thermalito Diversion Dam has limited visibility when viewed from the Diversion Pool and the adjacent trails and access road. From the Diversion Pool and areas next to it, the dam appears as a low horizontal form that spans the width of the pool and is seen underneath the Union Pacific railroad bridge (see Appendix A – KOP TD-2 Diversion Pool DUA). The upstream face of the dam contrasts in color and form with its surroundings, but because of the presence of the Union Pacific railroad bridge and the limited view from the top of the dam, the Thermalito Diversion Dam is only a minor component of views from upstream.

The downstream face of the dam is much more visible than the upstream face because views of it are not obstructed and because the top of the dam is approximately 40-ft above the water level below it (in the Fish Barrier Pool). The downstream face can be seen from northern parts of the City of Oroville, including Table Mountain Boulevard Bridge (which spans the LFC), the Feather River Nature Center (see Appendix A: KOP BR-1 Feather River Nature Center), and from the portions of the Feather River Fish Hatchery near the Fish Barrier Dam. From this location, the Diversion Pool Dam is visible upstream of, and beyond, the Fish Barrier Dam. The Diversion Dam Power Plant along the dam's south abutment is visible in the middleground from some areas and appears as part of the dam. The part of the dam that is most noticeable is the concrete spillway structure (a regulated Ogvee spillway), which consists of vertical concrete walls that extend downstream of the dam and are quite visible due to the shadows cast by them against the horizontal portion of the dam.

In summary, the upstream face of the dam has a neutral effect on the aesthetic/visual environment, and of areas from which it can be seen. The downstream face of the dam

moderately contrasts in scale, form, color, and texture with its riverside environment and has a moderately negative effect on the downstream aesthetic/visual environment of the areas from which it can be seen.

6.2.1.3 Thermalito Power Canal

The 2-mile long Thermalito Power Canal passes through areas that are not highly visible to the general public. Most views of the Canal are from several overpasses (Cherokee Road, Table Mountain Boulevard, and Highway 70) which offer quick glimpses at the structure and the water in it. The linear, highly engineered Canal significantly contrasts in scale, form, line, and color with the nearby landscape.

In summary, the Thermalito Power Canal has a negative effect on the aesthetic/visual environment of locations from which it can be seen.

6.2.1.4 Thermalito Forebay

The 630-acre Thermalito Forebay is a significant aesthetic/visual feature in the landscape of the Oroville area (see Appendix A KOP TD-3 North Thermalito Forebay Recreation Area and KOP TD-4 South Thermalito Forebay Recreation Area). The Forebay is most visible from two recreation areas (the North and South Forebay Recreation Sites), the bike trail that travels around the northern edge of the North Forebay and the southern edge of the South Forebay, Highway 70, the Nelson Avenue overpass, and Grand Avenue. With its irregular 10 miles of largely undeveloped shoreline, the Forebay has a generally natural appearance and blends in well with the surrounding landscape.

In summary, the Forebay has a moderately positive effect on the aesthetic/visual environment of the areas from which it can be seen.

6.2.1.5 Thermalito Forebay Dam

The earth-filled Forebay Dam is approximately 3 miles long and 91 ft high. Except for the Forebay Dam and Pumping-Generating Plant, the dam has the general appearance of a long earth-filled dike. It is the least visible large-scale Project facility because of its distance from most viewers. The dam can be seen in the foreground from the waters of the Forebay, in the middle- to background from Grant Avenue (especially from the overpass), and in the background of scattered residential areas southeast of the dam. In southern views across the Forebay, the top of the dam embankment appears as a low horizontal form on the horizon. The dam embankment appears as a long linear form on the landscape from areas south of it. To a certain degree, the grass-covered embankment contrasts with the surrounding landscape in terms of form, scale, and line. The Pumping-Generating Plant appears as a low concrete dam structure, below which there is a concrete platform on which electrical transformers and a long, windowless rectangular structure containing the generators are located. The dam and Pumping-

Generating Plant are of a scale, form, and color that is fairly compatible with the nearby landscape. They are also features that are not seen in the foreground by many people.

In summary, the Thermalito Dam and Pumping Generating Plant have neutral effects on the aesthetic/visual environment of the areas from which they can be seen.

6.2.1.6 Transmission Lines

Three 230-kV overhead transmission lines extend approximately 9 miles from the Hyatt Power Plant Switchyard to PG&E's Table Mountain Substation. The lines are located on the hillsides above and to the north of the upper portion of the Diversion Pool. Transmission lines have three visible components that affect the aesthetic/visual environment. They are the support towers, the conductors (which are cables that are commonly referred to as "lines"), and the cleared rights-of-way underneath transmission lines. The most visible components of the transmission lines that connect the Hyatt Power Plant Switchyard to the Table Mountain Substation are the steel support towers, as illustrated in Figure 6.2-1. Support towers introduce strong vertical elements into the landscape that, depending on the screening by topography and vegetation, can be highly visible. Some of the Project support towers are located so that they are silhouetted against the sky and introduce contrasting shape, form and color into the viewed landscape. These towers are very visible. Other towers are "in front" of the hillsides they cross and are not silhouetted against the skyline. These towers do not contrast as much as the towers that are silhouetted, but still contrast in color, text, and shape with their surroundings.

Conductors are also visible, but to a lesser extent than the towers. The transmission line is quite visible from the Diversion Pool area of the Project and Cherokee Road. Approximately 2.5 miles of the transmission line can readily be seen in this part of the Project Area before it disappears from sight as it goes over nearby hills on its way to the Table Mountain Substation. In addition to the Project transmission lines, other lines are very visible in the Project area. Some of these transmission lines may be perceived by some members of the public as being Project facilities. Cleared rights-of-way are often the most visible component of transmission facilities. However, this is not the case along most of the transmission lines at the Project, because viewers look up to see the lines and generally don't see cleared rights-of-way.

In summary, Project transmission lines (and other non-Project lines in the Project area) have a negative effect on the aesthetic/visual environment of the Project area.

6.2.2 Effects of Project Operations

Because the Diversion Pool, Power Canal, and Thermalito Forebay are all designed to share the same operating water level and are essentially the same hydrologic system, the water levels in each of these facilities rise and subside in unison. The system does not fluctuate much on a daily basis, but during the summer it is generally cycled down

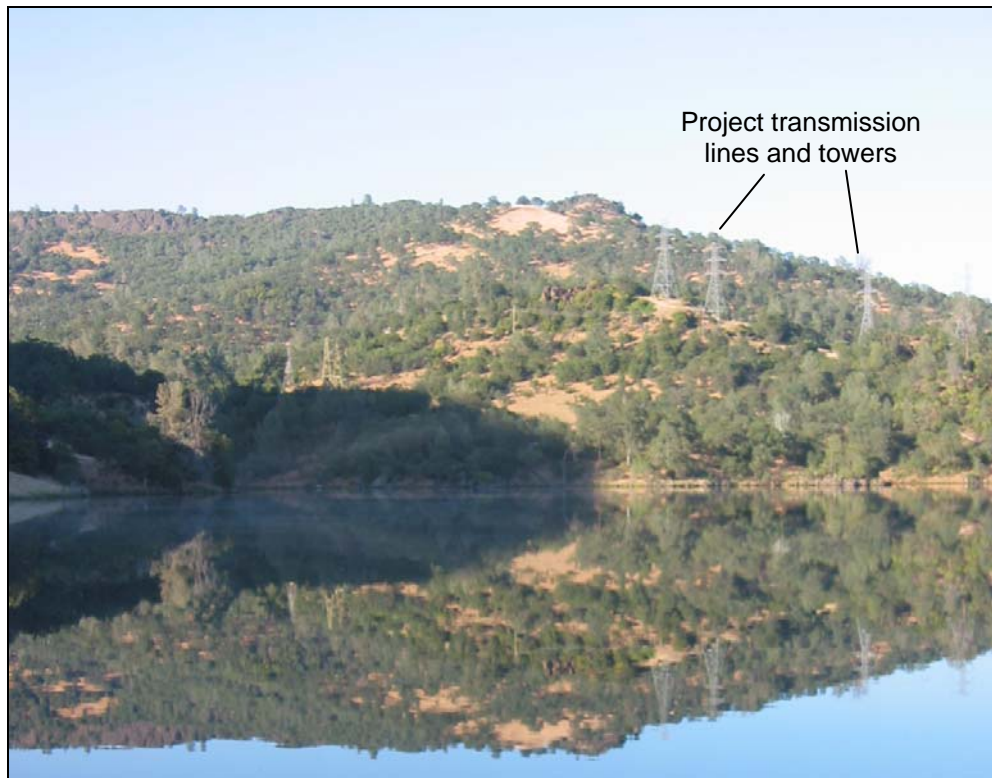


Figure 6.2-1. Transmission line towers behind Diversion Pool.

2 to 4 ft during the middle of the week and then refilled by the weekend to refresh the swimming lagoon at the North Forebay Recreation Area. The pool may also rise during the winter and spring when severe flooding events occur that have the potential to increase the water elevation. During periods in the summer when the Diversion Pool and Forebay are lowered 2 to 4 ft, shoreline and mudflats at some areas of the Forebay are exposed, as are beaches at the North and South Forebay Recreation Areas.

In summary, at times when the elevations of these facilities is 2 to 4 ft below full pool, there is a moderately negative effect on the aesthetic/visual environment of these facilities. However, because the Diversion Pool and Forebay elevations change so little over much of the year and introduce two bodies of water into the landscape of the Project Area, operations have an overall moderately positive effect on the aesthetic/visual environment of areas near the Diversion Pool and Forebay.

6.2.3 Effects of Project Facilities and Operations on KOPs

The following describes the effects of Project facilities related to the Thermalito Diversion Pool, Dam, Forebay and transmission lines on KOPs from which these facilities are visible. Table 6.2-2 summarizes the effects.

Table 6.2-2. Summary of the effects of Project facilities and operations on the aesthetic/visual environment of areas seen from KOPs located near the Thermalito Diversion Pool, Dam, Power Canal and Forebay.

KOP	Effects	Notes
KOP TD-2 – Diversion Pool	Diversion Dam = moderately negative effect. Transmission lines = negative effect. Project operations = moderately positive effect.	Diversion Pool and Diversion Dam seen in foreground. Transmission lines seen in foreground.
KOP TD-3 – North Thermalito Recreation Area	Project operations = moderately positive effect.	The Forebay is seen in foreground.
KOP TD-4 – South Thermalito Recreation Area	Dam = moderately negative effect. Project operations = moderately positive effect.	The Forebay Reservoir is seen in the foreground. The Forebay Dam is seen in the middleground.
KOP BR-1 – Feather River Nature Center	Diversion Dam = moderately negative effect	
Total	Dam = 3 Moderately Negative Transmission line = 1 Negative Operations = Moderately positive	

Source: EDAW 2003

Two KOPs have views of the Diversion Dam and Pool. KOP TD-2 (at the Diversion Pool DUA) is located along the unpaved access road located on the west side of the Diversion Pool. It represents upstream views from the lower portion of the Diversion Pool that many viewers have when recreating in the area or driving south on the access road. This KOP offers foreground views of the Diversion Pool and middleground views of the upstream face of the Diversion Dam. Because of the low profile of the upstream face of the dam and the presence of the Union Pacific railroad bridge and unpaved access road, the Diversion Dam does not draw much attention. This KOP also affords foregrounds views of the Diversion Pool. Because the upstream face of the dam is not very visible from this KOP, it has a neutral effect on the aesthetic/visual environment. Since the Project operations result in relatively minor pool elevation fluctuations within the Diversion Pool, operations have a positive effect on the aesthetic/visual environment of the area seen from this KOP.

KOP BR-1 (at the Feather River Nature Center) is located along the east bank of the LFC within the Feather River Nature Center. It represents views that people using the park have of the Project and the surrounding landscape. From this location, the Diversion Dam and the Fish Barrier Dam can be seen, as can the Feather River Fish Hatchery. As mentioned above in Section 6.2.1, the Diversion Dam has a moderately negative effect on the aesthetic/visual environment of the areas below the dam, including this KOP.

The Thermalito Power Canal is not seen from any of the KOPs.

The Thermalito Forebay is seen from two KOPs located adjacent to the Forebay. KOP TD-3 (at the North Thermalito Forebay Recreation Area), is located on the beach and has views of the Forebay waters and the surrounding irrigated landscaped areas. The dam can be viewed in the background of some places. Although the aesthetic/visual quality of the beach is somewhat negatively affected by the lowered pool elevations that can occur during summer weekdays, the overall effect of the Project operations on the aesthetic/visual environment of KOP TD-3 is moderately positive.

KOP TD-4 (at the South Thermalito Forebay Recreation Area) also has foreground views of the waters of the Forebay and the Forebay Dam. In addition, this KOP offers recreationists views of the recreation area's beach, the concrete boat ramp, and an equipment lift located at the dam. Although the beach is somewhat negatively affected by lowered pool elevations that can occur during summer weekdays, and the setting of the recreation area is open, has sparse vegetation, and lacks site definition, the overall effect of the dam on the aesthetic/visual environment of KOP TD-4 is neutral and the effect of Project operations is moderately positive.

In summary, Project operations have a moderately positive effect at all the KOPs. The Diversion Dam has a negative effect on two KOPS and a neutral effect on one. The transmission line has a negative effect on one KOP.

6.3 THERMALITO AFTERBAY

Section 5.2.3 contains a brief description of the physical characteristics of the Thermalito Afterbay and Afterbay Dam, views, and aesthetic/visual features (Table 6.3-1). This section includes a general discussion of the effects that Project facilities and operations associated with the Thermalito Afterbay have on the areas aesthetic/visual environment. It concludes with a discussion of how the facilities and operations affect the aesthetic/visual environment of three representative KOPs (KOP TA-1 [Larkin Road DUA], KOP TA-2 [Monument Hill DUA] and KOP TA-3 [Highway 99 near the Fish Hatchery]).

6.3.1 Effects of Project Facilities

The 8-mile long Thermalito Dam is one of the most visible components of the Oroville Project. The earth fill dam is essentially a linear, unvegetated dike located on the west and south sides of the Afterbay. It rises steeply to 39 ft above the adjacent terrain and is similar in appearance to other dikes found throughout the Project area. The river outlet – headworks, which is located along Larkin Road and provides water release into the Feather River, is a concrete structure that includes a control building and spillway.

Table 6.3-1. General visibility and effect of Project facilities associated with the Thermalito Afterbay.

Facility/General Effect	Comments	KOPs and Areas Facility Visible From
Thermalito Afterbay Dam Moderately Negative to Negative Effect	The "L"-shaped 8-mile long earthfill dam is no more than 39 ft in height. The dam has a very strong visual presence along the west and southern side of the Afterbay. Highway 99 parallels the western levee for approximately 4 miles. Highway 162 crosses the Afterbay. The concrete river outlet – headworks is very visible from the Feather River and parts of the OWA.	<ul style="list-style-type: none"> • KOP TA-1 (Larkin Road DUA) • KOP TA-2 (Monument Hill DUA) • Highway 99 • Highway 162 • Larkin Road • Feather River and parts of OWA
Thermalito Afterbay Positive Effect	4,300-acre (6.7 square mile) reservoir	<ul style="list-style-type: none"> • KOP TA-1 (Larkin Road DUA) • KOP TA-2 (Monument Hill DUA) • Highway 99 • Highway 162 • Larkin Road

Source: EDAW 2003

The west side of the dam is visible to people driving adjacent to it along Highway 99 (a major local transportation route) and the southern side is visible to people driving along Hamilton Road and Larkin Road. The river outlet – headworks are visible to people recreating along the LFC and the portion of the Feather River below the river outlet (which is very popular with anglers) and from portions of the OWA.

The Thermalito Afterbay Dam contrasts with the surrounding aesthetic/visual environment in scale, form, line, and texture. This is particularly true along the western portion of the dam adjacent to Highway 99 and the area of the Feather River and OWA near the river outlet - headworks.

In summary, the dam has a moderately negative effect on the aesthetic/visual environment of areas from which it can be viewed in close proximity (in the foreground) and a moderately negative effect in areas where it is visible in the middleground Table 6.3-2).

6.3.2 Effects of Project Operations

The Thermalito Afterbay is a large, shallow, open reservoir that has frequent water level fluctuations and a high surface-to-volume ratio. The Afterbay presents the most complex hydrologic regime of all the Oroville Facilities' reservoirs. It has multiple outlets that deliver water to several different agricultural canals, an outlet that regulates the amount of water that is discharged through the Thermalito Afterbay outlet into the Feather River, and a pump-back operations. The Afterbay's reservoir elevation is generally level, with fluctuations within the 1 to 1½ ft range. During special operations,

the reservoir can fluctuate up to 2 ft, which is the maximum fluctuation. At the lower end of the this range, some shoreline areas have mudflats exposed.

In summary, because the Afterbay reservoir only fluctuates between 1 and 1½ ft below full pool (and the resulting exposed mud flats), the reservoir and its operations have a positive effect on the aesthetic/visual environment of areas near the Afterbay (Table 6.3-2).

Table 6.3-2. Summary of the effects of Project facilities and operations on the aesthetic/visual environment of areas seen from KOPs located near the Thermalito Afterbay.

KOP	Effects	Notes
TA-1 (Larkin Road DUA)	Dam = moderately negative effect. Project operations = positive effect.	Dam seen in middleground
TA-2 (Monument Hill DUA)	Dam = moderately negative effect. Project operations = positive effect.	Dam seen in middleground
TA-3 (Highway 99)	Dam = negative effect.	Dam seen in foreground.
Total	Operations = Positive Dam = 2 Moderately Negative Dam = 1 Negative	

Source: EDAW 2003

6.3.3 Effects of Project Facilities and Operations on KOPs

Three KOPs have views of the Thermalito Dam. They are KOP TA-1 (Larkin Road DUA), KOP TA-2 (Monument Hill DUA), and KOP TA-3 (Highway 99). Views of the dam from KOP TA-1 and TA-2 are typical of views from the waters of the Afterbay or areas of land from which the dam can be viewed. From these locations, the upstream face of the dam can be seen in the foreground or middleground. The low profile of the dam does not draw visual attention. The upstream side of the dam has a neutral effect on the aesthetic/visual environment of the areas from which it can be seen.

The downstream side of the dam is quite visible from KOP TA-3 and others along Highway 99. From this vantage point the dam appears as a large levee and contrasts with the surrounding aesthetic/visual environment in scale, form, line and texture. It has a negative effect on the aesthetic/visual environment from which it can be seen.

6.4 LOW FLOW CHANNEL (LFC) AND OROVILLE WILDLIFE AREA (OWA)

Section 5.2.4 contains a brief description of the physical characteristics of the LFC and the OWA along with an overview of views within and near the two areas and the types of viewers that see these areas. This section discusses the effects of Project facilities and operations on the aesthetic/visual environments of the portions of the LFC and OWA that are within the Project boundary (Table 6.4-1). It concludes with a discussion of how Project facilities and operations effect the aesthetic/visual environment of: KOP

Table 6.4-1. General visibility and effect of Project facilities in the LFC and the OWA.

Facility/General Effect	Comments	KOPs and Areas Facility Visible From
Fish Barrier Dam and Fish Barrier Pool Moderately Positive Effect	Concrete dam with extensive spillway is 600-ft long and pool is 50 acres in size.	<ul style="list-style-type: none"> • KOP BR-1 (Feather River Nature Center) • Table Mountain Boulevard Bridge • Some residential areas of northern Oroville
Feather River Fish Hatchery Moderately Negative Effect	This facility includes a ½-mile long fish ladder, offices, underwater fish viewing area, restrooms, two lighted parking areas, fencing, a spawning-hatchery building, rearing channels and other facilities.	<ul style="list-style-type: none"> • KOP BR-1 (Feather River Nature Center) • Feather River Fish Hatchery • Table Mountain Boulevard Bridge • Some residential areas of northern Oroville • LFC levees and trails
Thermalito Afterbay Dam Negative Effect	4,300-acre (6.7 square mile) reservoir	<ul style="list-style-type: none"> • Visible from Feather River and parts of OWA

Source: EDAW 2003

BR-1 (Feather River Nature Center), KOP BR-2 (Thermalito Afterbay outlet), KOP OWA-1 (One-Mile Campground), and KOP OWA-2 (OWA Bird Viewing Area).

6.4.1 Effects of Project Facilities and Operations

Four Project facilities can be seen from the portion of the LFC immediately below the Diversion Dam. They are the downstream face of the Diversion Dam, the Fish Barrier Dam Pool, the Fish Barrier Dam, and the Feather River Fish Hatchery. The effects of the Diversion Dam on the aesthetic/visual environment are described in Section 6.2.1.2 and the effects of the Fish Barrier Pool, Fish Barrier Dam, and Fish Hatchery are described below in this Section. One additional Project facility, the Thermalito Afterbay Dam and head works – River Outlet, can be seen from the downstream portion of the LFC and from parts of the OWA. The dam and head work's effect on the aesthetic/visual environment were described in Section 6.3.1.

6.4.1.1 Fish Barrier Dam and Fish Barrier Pool

The Fish Barrier Dam is a 600-ft long concrete structure, the top of which is approximately 30-ft above the LFC below it. The dam is a horizontal structure over which water falls in a continuous sheet (Figure 6.4-1). The “falls” over the dam, along with migrating salmon that congregate below the dam before going up the fish ladder, attracts numerous visitors to the Feather River Fish Hatchery's viewing platform. The

Insert Figures 6.4-1 and 6.4-2

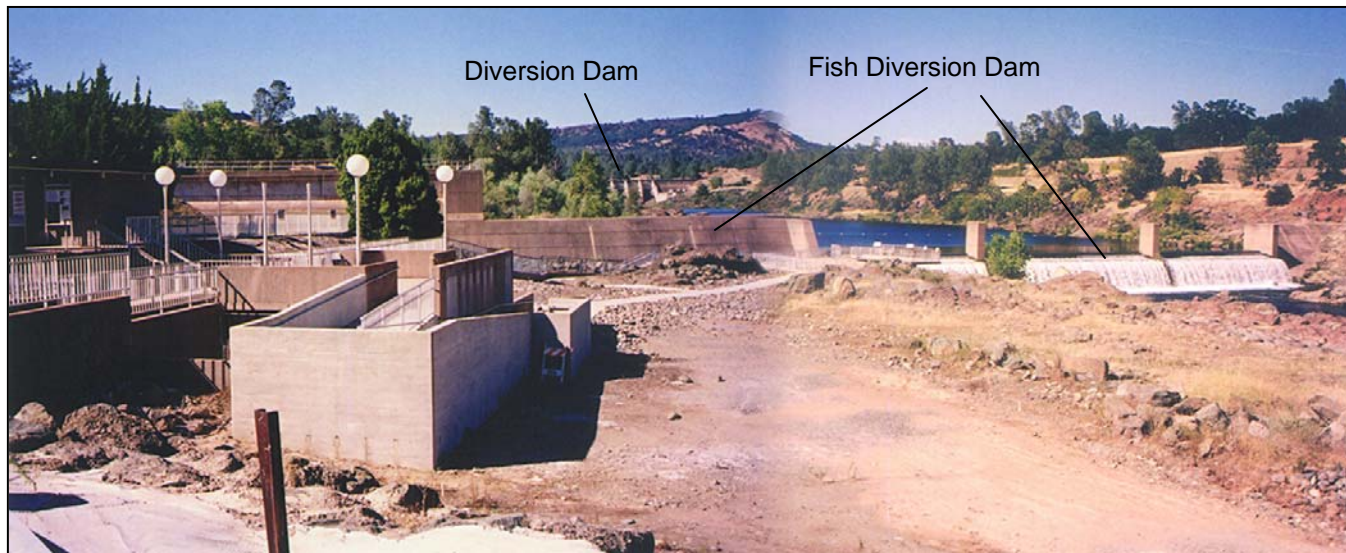


Figure 6.4-1. Feather River Fish Hatchery and Fish Diversion Dam.



Figure 6.4-2. Thermalito Afterbay outlet.

Back of Figures 6.4-1 and 6.4-2

Fish Barrier Pool is located immediately upriver of the dam and appears as a 50-acre water feature that is relatively still. The Fish Barrier Dam and Pool can be seen from the same locations mentioned in Section 6.2.1.2 in the description of the downstream face of the Diversion Dam. The Fish Barrier Dam and Pool add interest to the views of the areas downstream from it.

In summary, even though the dam does contrast with its surroundings in terms of form, line, and to a lesser degree, color, the overall effect of the dam and its waterfall are compatible and have a moderately positive effect on the aesthetic/visual environment of the areas from which they can be seen.

6.4.1.2 Feather River Fish Hatchery

The Feather River Fish Hatchery is operated by DFG and operated by DWR. A view of the northern portion of the facility is included in Figure 6.4-1. The features of the Fish Hatchery can be seen from areas along the opposite side of the river (such as the Feather River Nature Center, the Table Mountain Boulevard Bridge, and parts of the levee and trail system). Project facilities that are visible in the upper part of the LFC include the Feather River Fish Hatchery, the Feather River Fish Barrier Dam, and the Feather River Fish Barrier Pool (see Figure 5.2-5). The 50-acre Fish Barrier Pool is formed by the Fish Barrier Dam and located upstream from the hatchery. The 91-ft high, 600-ft long, concrete, gravity Fish Barrier Dam diverts fish from the LFC into the Fish Ladder, which leads to the Hatchery, which are managed by DWR. The Feather River Fish Hatchery consists of buildings, fences, parking areas and drives, light standards, riprap on the river banks, and features a concrete fish ladder, raceways, and rearing channels. The fish ladder that leads to the hatchery is approximately ½ mile long and consists of a series of concrete “steps” and pools that range in length from 8 to 1,000 ft, with a minimum width of 6 ft and a minimum water depth of 2 ft. Rearing channels are concrete-lined raceways, blocked off in intervals to form 48 individual pools, each 100 ft long and 10 ft wide. The raceways are covered with netting to protect the fish from avian predators such as hawks and herons. The hatchery facilities contrast with their surrounding environment in form, line, color, and texture.

In summary, due to the extensive amount of pavement, concrete and other hard materials at the hatchery, tall light standards, and a scarcity of natural or planted areas, the hatchery has a moderately negative effect on the aesthetic/visual environment of the areas from which it can be seen.

6.4.1.3 Thermalito Afterbay Outlet

The Thermalito Afterbay outlet is where water from the Thermalito Afterbay is released into the LFC and the Feather River. Its most conspicuous feature is the approximately 600 ft long spillway that guides the release of water from the Afterbay into the river below. The facility also contains a control building and chain link security fence that extends around the facility, along the spillway, and down to the river. The facility is

most visible from the Feather River, adjacent OWA lands, and the levee. The concrete structure contrasts with the river environment in color, texture, and form.

In summary, the outlet facility has a negative effect on the aesthetic/visual environment of most areas from which it can be seen (Figure 6.4-2).

6.4.2 Effects of Project Operations

The LFC extends 8 miles from the Fish Barrier Dam to the Thermalito Afterbay outlet. Under an agreement with the DFG, flows in the LFC below the Thermalito Diversion Dam are regulated at 600 cfs, except during flood events when flows have reached as high as 150,000 cfs (DWR and DFG 1983). The majority of the water in the LFC passes through a single channel that is contained by armored levees on both sides. The tops of parts of the levees have recreational trails and receive heavy use. Side-channel or secondary channel habitat within the LFC is extremely limited. As a result of periodic flood flows and the absence of gravel recruitment, the LFC banks and streambed consist of armored cobble. The LFC banks do not have the appearance of a natural river system, although a variety of vegetation (some native riparian and some exotic) visually “soften” the stabilized LFC banks. However, by supplying a minimum flow of 600 cfs, the LFC riverbed is submerged throughout the year and contains nine major riffles and several smaller ones, providing the appearance of a natural, free-flowing river.

6.4.3 Effects of Project Facilities and Operations on KOPs

Two KOPs have views of Project facilities (Table 6.4-2). They are BR-1 (Feather River Nature Center) and BR-2 (Thermalito Afterbay outlet). The Feather River Nature Center has clear views of the Fish Barrier Dam, the Feather River Fish Hatchery, and the downstream face of the Diversion Dam. Essentially a continuous water fall, the Fish Barrier Dam creates interest and has a moderately positive effect on the aesthetic/visual environment of the area seen from this KOP. The Fish Hatchery and the downstream face of the Thermalito Diversion Dam are very visible from this location, and have a moderately negative effect on the aesthetic/visual environment. Project operations provide a steady minimum 600 cfs flow and have a neutral effect. KOP BR-2 is located on the levee adjacent to the Thermalito Afterbay outlet, across the LFC from part of the OWA. From this location the water released from the outlet merges with the LFC and Feather River. The concrete outlet structure and associated features such as a chain link fence have a moderately negative effect on the aesthetic/visual environment of this area. Project operations provide a steady flow in the LFC and provide releases through the outlet’s concrete spillway from the Thermalito Afterbay, which provide interest and result in a neutral effect.

Table 6.4-2. Summary of the effects of Project facilities and operations on the aesthetic/visual environment of areas seen from KOPs located near the LFC and OWA.

KOP	Effect	Notes
BR-1 (Feather River Nature Center)	Fish Barrier Dam = moderately positive effect. Thermalito Diversion Dam = moderately negative effect Feather River Fish Hatchery = moderately negative effect. Project operations = neutral effect.	The Fish Barrier Dam and Hatchery are in the foreground. The Diversion Dam is in the middleground.
BR-2 (Thermalito Afterbay outlet)	Dam = negative effect. Afterbay outlet = negative effect. Project operations = neutral effect.	Outlet seen in foreground.
OWA-1 (One Mile Campground)	No Project facilities seen. Project operations can not be seen.	NA
OWA-2 (Bird Viewing Area)	No Project facilities seen. Project operations can not be seen.	NA
Total	Moderately Positive = 1 Moderately Negative = 2 Negative = 1 Operations = Neutral	

Source: EDAW 2003

6.5 PROJECT CONSISTENCY WITH AESTHETIC/VISUAL COMPONENTS OF RELEVANT POLICIES, REGULATIONS, GUIDELINES, AND STANDARDS

This section discusses the consistency of Project facilities and operations with the policies, regulations, guidelines, and standards identified in Section 5.3 (Aesthetic/Visual Related Policies, Regulations, Guidelines, and Standards).

6.5.1 USFS

No Project facilities (other than Lake Oroville) are located within view of USFS lands that are within or adjacent to the Project boundary. This evaluation examines whether the Project is consistent with relevant visual resource standards and guidelines for the four Management Areas (Galen, French Creek, Kellogg, and Feather Falls) that have been assigned to USFS lands within and near the Project and the one National Forest Scenic Byway that passes through the Project.

6.5.1.1 Feather Falls Management Area

The management direction for much of the Feather Falls Management Area is to maintain pleasing visual corridors such as the viewshed of the Forbestown Road and to protect scenic values near Feather Falls. These areas have VQOs of Retention and Partial Retention. In general, the Project cannot be seen from these areas; if parts of it

can be seen, they would generally be in the background distance zone (over 5 miles away). Therefore, the Project has no effect on the aesthetic/visual environment of the vast majority of the Feather Falls Management Area.

Areas of the Management Area that are within and adjacent to the Project boundary are steep and difficult to access and generally receive little visitation. These lands are part of a checkerboard ownership pattern with alternating sections of USFS lands and lands owned by other entities. The prescriptions for the Forest lands are Minimal Management and Non-Forest Vegetation, both of which allow for more alteration to the landscape than in other parts of the Management Area. The VQOs for these prescriptions vary from location to location. No Project facilities can be seen from the portion of the Feather Falls Management Area within or adjacent to the Project boundary. At full reservoir elevations, this part of Lake Oroville would meet a VQO of Retention. As the reservoir elevation is lowered, the VQOs change to Partial Retention and Modification, especially when the area becomes dewatered during the summer. These VQOs should meet the objectives of the Minimal Management and Non-Forest Vegetation visual prescriptions.

6.5.1.2 French Creek Management Area

The primary management directions for visual resources in this Management Area are to maintain a pleasing visual corridor for Highway 70 (the Feather River National Forest Scenic Highway, part of which touches on the very western tip of this part of the Project boundary) and to minimize the impact of transmission lines and hydroelectric facilities. The portions of the Management Area that are visible to the public have VQOs of Retention and Partial Retention. In general, the Project (including Project transmission lines and other facilities) cannot be seen from these areas; if parts of it can be seen, they would generally be in the background distance zone (over 5 miles away). Along the Feather River National Forest Scenic Highway, the West Branch can be briefly viewed from the bridge near Vinton Gulch. The Project has no effect on the aesthetic/visual environment of the vast majority of the French Creek Management Area.

The portion of the Management Area that is within and adjacent to the Project boundary is steep and difficult to access and, like the Feather Falls Management Area, is in an area with a checkerboard ownership pattern. Visitation to this area is low. The management prescription for this part of the French Creek Management Area is Minimal Management, which has VQO prescriptions that vary from location to location. No Project facilities can be seen from the portion of the Management Area that is contained within the Project boundary. As with the Feather River Management Area, the portion of the French Creek Management Area that is located within the Project boundary is located at the upper end of the Project (in the Upper North Fork) and is commonly dewatered during the summer. At full reservoir elevations, this part of Lake Oroville would meet a VQO of Retention. As the reservoir elevation is lowered, the VQOs change to Partial Retention and Modification, especially when the area becomes

dewatered during the summer. These VQOs should meet the objectives of the Minimal Management visual prescriptions.

6.5.1.3 Galen Management Area

The primary management direction for visual resources in this Management Area is to maintain pleasing visual corridors for the Quincy-Oroville Road corridor. The portions of the Management Area that are visible to the public have VQOs of Retention and Partial Retention. In general, the Project cannot be seen from these areas; if parts of it can be seen, they would generally be in the background distance zone (over 5 miles away).

The portion of this Management Area within and adjacent to the Project boundary is steep, difficult to access, and is within an area with a checkerboard ownership pattern that results in USFS lands being separated by lands owned by other entities. The management prescriptions for USFS lands within the Galen Management Area that are located within the Project boundary are Minimal Management, Non-Forest Vegetation, and Timber Regulation Class III. The VQOs for the Minimal Management and Non-Forest Vegetation prescriptions vary from location to location. The VQO for the Timber Regulation Class III classification is Partial Retention. No Project facilities can be seen from the portion of the Management Area that is contained within the Project boundary. The portion of the Galen Management Area within the Project boundary is located in an arm of the Project (the Upper North Fork) with a considerable amount of shoreline exposed during the summer. At full reservoir elevations, this part of Lake Oroville would meet a VQO of Retention. As the reservoir elevation is lowered, the VQOs change to Partial Retention and Modification, especially when the area becomes dewatered during the summer. These VQOs should meet the objectives of the Minimal Management visual prescriptions.

6.5.1.4 Kellogg Management Area

Approximately half of the USFS land in this Management Area is contained within the Federally designated Middle Fork Feather River Wild and Scenic River area. This area is located upstream of the Project boundary. Management direction for the Management Area focuses on preserving the area to be consistent with the Wild and Scenic Rivers Act. The Project cannot be seen from these areas of the Management Area; if parts are visible, they would generally be in the middleground or background distance zone.

The management prescriptions for USFS lands within the Kellogg Management Area located within the Project boundary are Minimal Management and Non-Forest Vegetation. The VQOs for these prescriptions vary from location to location. No Project facilities can be seen from the portion of the Management Area that is contained within the Project boundary. As with the other Management Areas, the portion of this Management Area located within the Project boundary is at the upper end of the Project (in the Middle Fork) and is commonly dewatered during the summer. At full reservoir

elevations, this part of Lake Oroville would meet a VQO of Retention. As the reservoir elevation is lowered, the VQOs change to Partial Retention and Modification, especially when the area becomes dewatered during the summer. These VQOs should meet the objectives of the Minimal Management visual prescriptions.

6.5.1.5 Feather River National Forest Scenic Byway

The Feather River National Forest Scenic Byway (Highway 70) passes through the Project boundary (via the Highway 70 bridge) near the West Branch on lands that are not part of the National Forest System. From the bridge over the West Branch, the waters of the reservoir can be seen, as can the exposed shoreline when reservoir elevations are below full pool. National Forest Scenic Byways influence the way that USFS lands are managed, but have no direct influence on non-USFS lands. The Project is consistent with the intent of the Byway.

6.5.2 BLM

The BLM lands within and adjacent to the Project boundary have been assigned a BLM VRM class of Class II. This class has a visual management objective of retaining the existing character of the landscape. All of the BLM lands within and adjacent to the Project boundary have been identified in the Redding RMP as lands that are anticipated to be transferred or exchanged with other agencies. Current Project facilities and operations are consistent with visual objectives of these lands. If relicensing activities result in changes to these lands, an evaluation will need to be conducted in the PDEA to see if those potential changes would be consistent with the Class II objectives.

6.5.3 CalTrans

Although the part of Highway 70 that passes through the Project boundary is part of the National Forest Scenic Byway, it is not part of the State Scenic Byway Program. The segment is eligible for inclusion into the State system. State Scenic status places no restrictions on adjacent lands. The Project has no effect on the eligibility of this part of Highway 70 for inclusion into the State system.

6.5.4 Butte County General Plan

The Butte County General Plan does not contain a visual or scenic element. It does contain a Scenic Highways Element, which contains the eight policies referred to in Section 5.3.4 (Butte County General Plan). No highways within Butte County have been designated as Butte County Scenic Highways, but four highway segments that pass through the Project boundary have been assigned a zoning designation of "Scenic Highway." These are described in Section 5.3.4. The Project is consistent with the eight policies of the Scenic Highways Element. Changes that may occur within the Project boundary as a part of relicensing will have to be evaluated in the PDEA for consistency with the General Plan Scenic Highways Element.

7.0 REFERENCES

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APPENDICES

Appendix A – Selected Key Observation Points (KOPs)

Appendix B – Key Observation Point (KOP) Evaluation Forms

Appendix A

Selected Key Observation Points (KOPs)

Appendix B

Key Observation Point (KOP) Evaluation Forms

